GS4.108: 46/pt 156-165/981 MF

code of federal regulations

Shipping

COMPLETED

46

PARTS 156 TO 165
Revised as of October 1, 1981

022-003-94685-3

THE NATIONAL ARCHIVES OF THE UNITED STATES
• 1934 •

code of federal regulations

Shipping

46

PARTS 156 TO 165

Revised as of October 1, 1981

CONTAINING
A CODIFICATION OF DOCUMENTS
OF GENERAL APPLICABILITY
AND FUTURE EFFECT

AS OF OCTOBER 1, 1981

With Ancillaries

Published by
the Office of the Federal Register
National Archives and Records Service
General Services Administration

as a Special Edition of
the Federal Register

1934

U.S. GOVERNMENT PRINTING OFFICE
WASHINGTON : 1981

FOR SALE BY THE SUPERINTENDENT OF DOCUMENTS
U.S. GOVERNMENT PRINTING OFFICE
WASHINGTON, D.C. 20402

MICROFICHE (24[illegible])

SUBSCRIPTION PRICE: DOMESTIC-- $225.00 A YEAR,
$ 2.25 SINGLE COPY
FOREIGN -- $280.00 A YEAR
$ 2.85 SINGLE COPY

Table of Contents

Page

Explanation v

Title 46:

Chapter I—Coast Guard, Department of Transportation (Continued) 3

Finding Aids:

Material Approved for Incorporation by Reference 423

Table of CFR Titles and Chapters 429

Alphabetical List of Agencies Appearing in the CFR 443

List of CFR Sections Affected 451

Cite this Code C F R

thus: 46 CFR 157.01-1

Explanation

The Code of Federal Regulations is a codification of the general and permanent rules published in the Federal Register by the Executive departments and agencies of the Federal Government. The Code is divided into 50 titles which represent broad areas subject to Federal regulation. Each title is divided into chapters which usually bear the name of the issuing agency. Each chapter is further subdivided into parts covering specific regulatory areas.

ISSUE DATES

Each volume of the Code is revised at least once each calendar year and issued on a quarterly basis approximately as follows:

Title 1 through Title 16	as of January 1
Title 17 through Title 27	as of April 1
Title 28 through Title 41	as of July 1
Title 42 through Title 50	as of October 1

The appropriate revision date is printed on the cover of each volume.

LEGAL STATUS

The contents of the Federal Register are required to be judicially noticed (44 U.S.C. 1507). The Code of Federal Regulations is prima facie evidence of the text of the original documents (44 U.S.C. 1510).

HOW TO USE THE CODE OF FEDERAL REGULATIONS

The Code of Federal Regulations is kept up to date by the individual issues of the Federal Register. These two publications must be used together to determine the latest version of any given rule.

To determine whether a Code volume has been amended since its revision date (in this case, October 1, 1981), consult the "List of CFR Sections Affected (LSA)," which is issued monthly, and the "Cumulative List of Parts Affected," which appears in the Reader Aids section of the daily Federal Register. These two lists will identify the Federal Register page number of the latest amendment of any given rule.

EFFECTIVE DATES

Each volume of the Code contains amendments published in the Federal Register since the last revision of that volume of the Code. Source citations for the regulations are referred to by volume number and page number of the Federal Register and date of publication. Publication dates and effective dates are usually not the same and care must be exercised by the user in determining the actual effective date. In instances where the effective date is beyond the cut-off date for the Code a note has been inserted to reflect the future effective date.

OBSOLETE PROVISIONS

Provisions that become obsolete before the revision date stated on the cover of each volume are not carried. Code users may find the text of provisions in effect on a given date in the past by using the appropriate numerical list of sections affected. For the period before January 1, 1973, consult either the List of CFR Sections Affected, 1949-1963, or 1964-1972, published in three separate volumes. For the period beginning January 1, 1973, a "List of CFR Sections Affected" is published at the end of each CFR volume.

INCORPORATION BY REFERENCE

What is incorporation by reference? Incorporation by reference was established by statute and allows Federal agencies to meet the requirement to publish regulations in the Federal Register by referring to materials already published elsewhere. For an incorporation to be valid, the Director of the Federal Register must approve it. The legal effect of incorporation by reference is that the material is treated as if it were published in full in the Federal Register (5 U.S.C. 552(a)). This material, like any other properly issued regulation, has the force of law.

What is a proper incorporation by reference? The Director of the Federal Register will approve an incorporation by reference only when the requirements of 1 CFR Part 51 are met. Some of the elements on which approval is based are:

(a) The incorporation will substantially reduce the volume of material published in the Federal Register.

(b) The matter incorporated is in fact available to the extent necessary to afford fairness and uniformity in the administrative process.

(c) The incorporating document is drafted and submitted for publication in accordance with 1 CFR 51.4.

Properly approved incorporations by reference in this volume are listed in the Finding Aids at the end of this volume.

What if the material incorporated by reference cannot be found? If you have any problem locating or obtaining a copy of material listed in the Finding Aids of this volume as an approved incorporation by reference, please contact the agency that issued the regulation containing that incorporation. If, after contacting the agency, you find the material is not available, please notify the Director of the Federal Register, National Archives and Records Service, Washington DC 20408, or call (202) 523-4534.

CFR INDEXES AND TABULAR GUIDES

A subject index to the Code of Federal Regulations is contained in a separate volume, revised semiannually as of January 1 and July 1, entitled CFR INDEX AND FINDING AIDS. This volume contains the Parallel Table of Statutory Authorities and Agency Rules (Table I), and Acts Requiring Publication in the Federal Register (Table III). A list of CFR Titles, Chapters, and Parts and an alphabetical list of agencies publishing in the CFR are also included in this volume.

An index to the text of Presidential documents appears at the end of each compilation of Title 3, The President.

The Federal Register Index is issued monthly in cumulative form. This index is based on a consolidation of the "Contents" entries in the daily Federal Register.

A List of CFR Sections Affected (LSA) is published monthly, keyed to the revision dates of the 50 CFR titles.

INQUIRIES AND SALES

For a summary, legal interpretation, or other explanation of any regulation in this volume, contact the issuing agency. Inquiries concerning editing procedures and reference assistance with respect to the Code of Federal Regulations may be addressed to the Director, Office of the Federal Register, National Archives and Records Service, General Services Administration, Washington, D.C. 20408 (telephone 202-523-3517). Sales are handled exclusively by the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.

JOHN E. BYRNE,
Director,
Office of the Federal Register.

October 1, 1981.

New Publication

List of CFR Sections Affected

(1964 through 1972)

A Research Guide

These two volumes contain a compilation of the "List of CFR Sections Affected (LSA)" for the years 1964 through 1972. Reference to these tables will enable the user to find the precise text of CFR provisions which were in force and effect on any given date during the period covered.

Volume I (Titles 1 through 27) $15.00
Volume II (Titles 28 through 50) $14.00

ORDER FORM Mail to: Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402

Enclosed is $ ________ ☐ check,
☐ money order, or charge to my
Deposit Account No.
☐☐☐☐☐☐☐–☐

Order No. ____________

VISA
MasterCard

Credit Card Orders Only
Total charges $ ________ Fill in the boxes below.
Credit Card No. ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐
Expiration Date Month/Year ☐☐☐☐

Please send me ____ copies of the CODE OF FEDERAL REGULATIONS
Volume I $15.00 Stock No. 022-003-94233-5
Volume II $14.00 Stock No. 022-003-94234-3

Name—First, Last

Street address

Company name or additional address line

City State ZIP Code

(or Country)

PLEASE PRINT OR TYPE

For Office Use Only

Quantity		Charges
____	Enclosed	
____	To be mailed	
____	Subscriptions	
Postage		
Foreign handling		
MMOB		
OPNR		
____	UPNS	
____	Discount	
____	Refund	

THIS TITLE

Title 46—SHIPPING is composed of ten volumes. The parts in these volumes are arranged in the following order: Parts 1-29, 30-40, 41-69, 70-89, 90-109, 110-139, 140-155, 156-165, 166-199 and 200-end. The first nine volumes containing Parts 1-199 comprise Chapter I—Coast Guard, Department of Transportation. The tenth volume containing Parts 200 to end includes Chapter II—Maritime Administration, Department of Transportation, Chapter III—Coast Guard (Great Lakes Pilotage), Department of Transportation and Chapter IV—Federal Maritime Commission. The contents of these volumes represent all current regulations codified under this title of the CFR as of October 1, 1981.

Subject indexes appear for Subchapter B—Merchant Marine Officers and Seamen and Subchapter C—Uninspected Vessels following the subchapters in Parts 1-29; for Subchapter D—Tank Vessels in the Findings Aids section of Parts 30-40; for Subchapter F—Marine Engineering following the subchapter in Parts 41-69; for Subchapter H—Passenger Vessels following the subchapter in Parts 70-89; for Subchapter I—Cargo and Miscellaneous Vessels following the subchapter in Parts 90-109; for Subchapter J—Electrical Engineering following the subchapter in Parts 110-139; for Subchapter P—Manning of Vessels following the subchapter in Parts 156-165; and for Subchapter T—Small Passenger Vessels (Under 100 Gross Tons) following the subchapter in Parts 166-199.

For this volume the Chief Editor was Gary J. Bruegging. The Code of Federal Regulations publication program is under the direction of Martha B. Girard, assisted by Robert E. Jordan.

BLANK PAGE

X

would you like to know

if any changes have been made in these regulations since the revision date of this book without reading the FEDERAL REGISTER every day? If so, you **may wish to subscribe to the LSA (List of CFR Sections Affected.).**

LSA (List of CFR Sections Affected)

$10.00
per year

The LSA (List of CFR Sections Affected) is designed to lead users of the Code of Federal Regulations to amendatory actions published in the Federal Register, and is issued monthly in cumulative form. Entries indicate the nature of the changes.

Also available on a subscription basis . . .

Federal Register Index $8.00
per year

Indexes covering the contents of the daily Federal Register are issued monthly in cumulative form. Entries are carried primarily under the names of the issuing agencies. Significant subjects are carried as cross-references.

A finding aid is included in each publication which lists Federal Register page numbers with the date of publication in the Federal Register.

Note to FR Subscribers: FR Indexes and the LSA (List of CFR Sections Affected) will continue to be mailed free of charge to regular FR subscribers.

Mail order form to:
Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402

There is enclosed $_________ for _________ subscription(s) to the publications checked below:

_____ **LSA (LIST OF CFR SECTIONS AFFECTED) ($10.00 a year domestic; $12.50 foreign)**

_____ **FEDERAL REGISTER INDEX ($8.00 a year domestic; $10.00 foreign)**

Name____

Street Address____________________________________

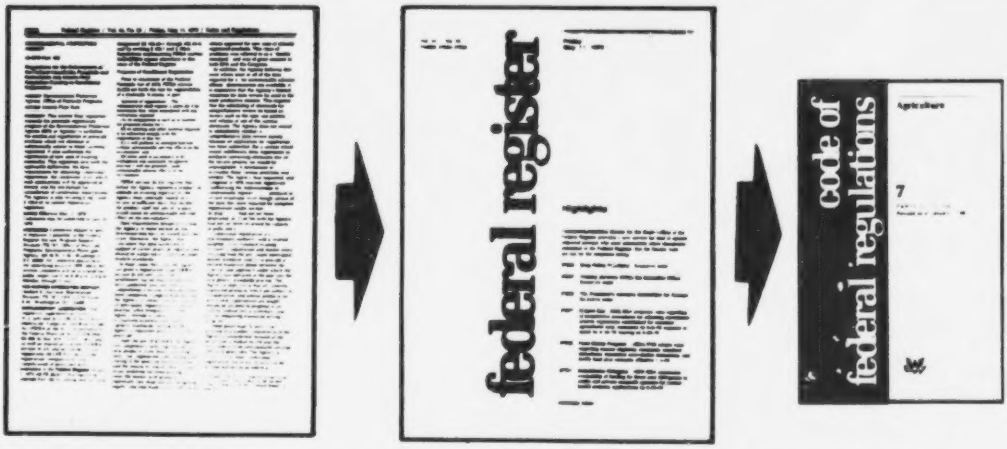
City____________________ State______________ ZIP____________

Make check payable to the Superintendent of Documents

X1

The Federal Register

Regulations appear as agency documents which are published daily in the **Federal Register** and codified annually in the **Code of Federal Regulations**



The **Federal Register**, published daily, is the official publication for notifying the public of proposed and final regulations. It is the tool to use to participate in the rulemaking process by commenting on the proposed regulations. And it keeps people up to date on the Federal regulations currently in effect.

The **Federal Register** contains many reader's aids—Highlights, Grant Information, list of hearings and Sunshine meetings—which simplify the user's job.

The **Code of Federal Regulations** (CFR) contains the annual codification of the final regulations printed in the **Federal Register**. Each of the 50 titles is updated annually.

Subscription Prices:

Federal Register	**Code of Federal Regulations**
One year: $75 domestic; $145 foreign	One year: $525 domestic; $656.25 foreign
Six months: $45 domestic; $90 foreign	Single volumes: Individually priced.

ORDER FORM Mail To Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402

Enclosed is $ __________ ☐ check,
☐ money order, or charge to my
Deposit Account No.
☐☐☐☐☐☐☐–☐
Order No __________

VISA

Credit Card Orders Only
Total charges $ __________ Fill in the boxes below
Credit Card No ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐
Expiration Date Month / Year ☐☐☐☐

Please send me .... **Federal Register:** $75 per year domestic; $145 foreign
$45 per six-month domestic; $90 foreign
.... **Code of Federal Regulations:** $525 per year domestic; $656.25 foreign

Name—First, Last
Company name or additional address line
Street address or additional address line
City State ZIP Code
(or Country)
PLEASE PRINT OR TYPE

FOR OFFICE USE ONLY
Quantity Charges
Enclosed
To be mailed
Subscriptions
Postage
Foreign handling
MMOB
OPNR
UPNS
Discount
Refund

Title 46—Shipping

(This book contains Parts 156 to 165)

Part

CHAPTER I—Coast Guard, Department of Transportation (Continued) 157

2

BLANK PAGE

Chapter I—Coast Guard, Dept. of Transportation (Continued)

(Parts 156 to 165)

SUBCHAPTER P—MANNING OF VESSELS

Part		Page
156	[Reserved]	
157	Manning requirements	4
	Index	21

SUBCHAPTER Q—EQUIPMENT, CONSTRUCTION, AND MATERIALS: SPECIFICATIONS AND APPROVAL

Part		Page
159	Approval of equipment and materials	23
160	Lifesaving equipment	30
161	Electrical equipment	267
162	Engineering equipment	320
163	Construction	378
164	Materials	385
165	[Reserved]	

SUBCHAPTER P—MANNING OF VESSELS

PART 156 [RESERVED]

PART 157—MANNING REQUIREMENTS

Subpart 157.01—Authority and Purpose

Sec.

157.01-1 Purpose of regulations.
157.01-5 Assignment of functions.
157.01-10 Authority for regulations

Subpart 157.05—Application

157.05-1 General.

Subpart 157.10—Definitions of Terms

157.10-1 General.
157.10-5 Able seaman.
157.10-10 Assistant engineer.
157.10-15 Chief engineer.
157.10-20 Deck crew.
157.10-25 Licensed officer.
157.10-30 Lifeboatman.
157.10-35 Master.
157.10-40 Mate.
157.10-45 Ordinary seaman.
157.10-50 Pilot.
157.10-55 Qualified member of the engine department.
157.10-60 Radio officer.
157.10-65 Sailors.
157.10-70 Seaman.
157.10-75 Staff officers.
157.10-80 Tankerman.
157.10-83 Operator of uninspected towing vessel.
157.10-85 Second-class operator of uninspected towing vessels.
157.10-87 Offshore supply vessel.

Subpart 157.15—Manning Requirements

157.15-1 Complement required by Certificate of Inspection.
157.15-5 Changes in Certificate of Inspection.
157.15-10 Right of appeal.
157.15-15 Enforcement officers.

Subpart 157.18—Officers' Competency Certificates Convention, 1936

157.18-1 Vessels subject to requirements of this subpart.
157.18-5 Detention of vessel.
157.18-10 Right of appeal.
157.18-15 Filing lists of officers with Collector of Customs.

Subpart 157.20—Computations

Sec.

157.20-1 Vessels affected.
157.20-5 Division into three watches.
157.20-10 Eight-hour day.
157.20-15 Able seamen.
157.20-20 Lifeboatmen.
157.20-25 Mates.
157.20-30 Master.
157.20-32 Radar observers.
157.20-35 Engineers.
157.20-37 Chief Engineer.
157.20-40 Pilot.
157.20-45 Lookouts.
157.20-50 Cabin watchmen and fire patrolmen.
157.20-55 Radio officers and radiotelegraph operators and watches.
157.20-60 Staff officers.

Subpart 157.25—Language Requirements

157.25-1 Vessels affected.
157.25-5 Orders by officers.
157.25-10 Muster of crew for language test

Subpart 157.30—Special Provisions

157.30-1 Manning of seagoing barges.
157.30-5 Tank vessels.
157.30-7 Passenger vessels of not more than 65 feet in length.
157.30-10 Officers for uninspected vessels.
157.30-15 Deck officers for steam or motor vessels operating under special conditions.
157.30-20 Engineers for steam or motor vessels operating under special conditions.
157.30-25 Vessels carrying persons in addition to crew.
157.30-30 Licensed operators for uninspected vessels subject to the act of April 25, 1940, as amended.
157.30-35 Vessels of over 65 feet in length and less than 100 gross tons.
157.30-40 Vessels not more than 1,000 gross tons.
157.30-45 Uninspected towing vessels operator's license.

Subpart 157.35—Special Duties of Pilots and Inland Mates

157.35-1 Pilots governed by rules.
157.35-5 Duties of mates of inland steam vessels.

AUTHORITY: R.S. 4405, as amended, 4462, as amended, sec. 6(b)(1), 80 Stat. 938; 46 U.S.C. 375, 416, 49 U.S.C. 1655(b); 49 CFR 1.4(a)(2) unless otherwise noted.

SOURCE: CGFR 52-43, 17 FR 9532, Oct. 18, 1952, unless otherwise noted.

Subpart 157.01—Authority and Purpose

§ 157.01-1 Purpose of regulations.

(a) The purpose of the regulations in this subchapter is to set forth uniform minimum requirements for the manning of vessels in accordance with the intent of Titles 52 and 53 of the Revised Statutes and acts amendatory thereof or supplemental thereto, as well as to implement various international conventions for safety of life at sea and other treaties which affect the merchant marine. The regulations are necessary to carry out the provisions of law affecting United States vessels and have force of law.

§ 157.01-5 Assignment of functions.

(a) The Department of Transportation Act (Pub. L. 89-670, 80 Stat. 931-950, 49 U.S.C. 1651-1659), transferred to and vested in the Secretary of Transportation "* * * all functions, powers, and duties, relating to the Coast Guard, of the Secretary of the Treasury and of other officers and offices of the Department of the Treasury" (subsection 6(b)(1), 49 U.S.C. 1655(b)). This transfer is subject to certain conditions, modifications, and exceptions as set forth in such act. By a rule in 49 CFR 1.4(a) the Secretary of Transportation delegated to the Commandant, U.S. Coast Guard, authority to exercise certain functions, powers, and duties as set forth in subsections 6(a)(4), 6(b)(1), and 6(g) of such act (49 U.S.C. 1655), subject to conditions, exceptions and modifications as described in 49 CFR Part 1. By a rule in 49 CFR 1.9 the Secretary of Transportation continued in effect actions taken prior to April 1, 1967.

(b) The Commandant, U.S. Coast Guard, in a notice dated March 31, 1967, and effective April 1, 1967 (32 FR 5611), approved the continuation of orders, rules, regulations, policies, procedures, privileges, waivers, and other actions, which had been made, allowed, granted, or issued prior to April 1, 1967, and provided that they shall continue in effect according to their terms until modified, terminated, repealed, superseded, or set aside by appropriate authority.

[CGFR 68-32, 33 FR 5721, Apr. 12, 1968]

§ 157.01-10 Authority for regulations.

(a) *General.* (1) The authority to prescribe regulations generally is set forth in R. S. 4405 and 4462, as amended (46 U. S. C. 375, and 416), as well as in other provisions of Titles 52 and 53 of the Revised Statutes and acts amendatory thereof or supplemental thereto. Under the provisions of R. S. 4403, as amended (46 U. S. C. 372), the Commandant, United States Coast Guard, superintends the administration of the vessel inspection laws and is required to produce a correct and uniform administration of the inspection laws, rules, and regulations.

(b) *Manning of inspected vessels.* (1) The requirements regarding the manning of inspected vessels are set forth in various statutes with many qualifications as to their applications. The regulations interpret or apply, subject to various limitations contained in the laws, R.S. 4400, as amended, 4401, as amended, 4417a, as amended, 4421, as amended, 4426, as amended, 4426a, 4427, as amended, 4438, as amended, 4438a, as amended 4453, as amended, 4463, as amended, 4477, as amended, 4488, as amended, 4551(j), as amended sec. 2, 38 Stat. 1164 as amended, sec. 13, 38 Stat. 1169, as amended, sec. 1, 52 Stat. 753, as amended, sec. 2, 40 Stat. 549, as amended, 41 Stat. 305, as amended, secs. 1 and 2, 49 Stat. 1544, 1545, as amended, sec. 7, 49 Stat. 1936, as amended, sec. 7, 53 Stat. 1147, as amended, secs. 7 and 17, 54 Stat. 165,166, as amended, sec. 3, 54 Stat. 347, as amended, secs. 1 to 8, 62 Stat. 232-234, as amended, sec. 3, 70 Stat. 152, and sec. 3, 68 Stat. 675 (46 U.S.C. 362, 364, 391a, 399, 404, 404-1, 405, 224, 224a, 435, 222, 470, 481, 643(j), 673, 672, 672b, 223, 363, 367, 689, 247, 526f, 526p, 1333, 229a-229h, 390b, and 50 U.S.C. 198).

(c) *Manning of uninspected vessels.* (1) The authority for regulations regarding manning of all vessels of 200 gross tons and over, however propelled, including yachts, navigating the high seas, which are subject to the provisions of the Officers' Competency Certificates Convention, 1936 (International Labor Organization Draft Convention Numbered 53), is in R. S. 4438a, as amended (46 U.S.C. 224a). In addition, the authority for regulations regarding operators of uninspected towing vessels, is contained in R.S. 4427, as amended (86 Stat. 423, 46 U.S.C. 405(b)).

(2) The authority for regulations regarding the licensed operator for uninspected motorboats, or other vessels of fifteen gross tons or less propelled by machinery other than steam, while carrying passengers for hire, is in secs. 7 and 17, 54 Stat. 165, 166, as amended (46 U.S.C. 526f, 526p).

(3) The authority for regulations regarding crews of uninspected vessels of 100 gross tons and upward, except fishing or whaling vessels, or yachts, or those vessels navigating rivers exclusively and the smaller inland lakes, is in sec. 13 (a) 38 Stat. 1169, as amended (46 U. S. C. 672(a)).

(R.S. 4427 as amended: 46 U.S.C. 405(b); 49 CFR 1.46(o)(3))

[CGFR 52-43, 17 FR 9532, Oct. 18, 1952, as amended by CGFR 58-8, 23 FR 2609, Apr. 19, 1958: CGFR 61-57, 26 FR 12082, Dec. 16, 1961: CGFR 69-116, 35 FR 6861, Apr. 30, 1970; CGD 72-132R, 38 FR 5750, Mar. 2, 1973; CGD 80-131, 45 FR 69242, Oct. 20, 1980]

Subpart 157.05—Application

§ 157.05-1 General.

(a) The regulations in this part shall be applicable to all vessels, other than inspected passenger vessels of not more than 65 feet in length, which are subject to the manning requirements contained in the navigation and vessel inspection laws of the United States.

(b) Some of the navigation and vessel inspection laws do not authorize the establishment of a minimum number of officers and members of the crew to be carried on board a vessel but state that the vessel shall not be operated or navigated unless certain manning requirements are met. In these cases, it is the responsibility of the owner, master, or person in charge or command of the vessel, to determine if the officers and crew carried meet the requirements of the applicable navigation and vessel inspection laws.

(c) At the beginning of the various subparts or sections, a more specific application is generally given for the particular portion of the text involved. This application may be according to size and type of vessel or waters navigated or services of vessel to which the text pertains.

[CGFR 52-43, 17 FR 9532, Oct. 18, 1952, as amended by CGFR 61-14, 26 FR 3926, May 5, 1961]

Subpart 157.10—Definitions of Terms

§ 157.10-1 General.

(a) The terms defined in this subpart apply only to manning of vessels subject to the manning provisions in the navigation and vessel inspection laws of the United States.

§ 157.10-5 Able seaman.

(a) The term "able seaman" means any person holding a certificate of service as able seaman issued by the Coast Guard attesting to his competency and who may serve in such capacity within the restrictions placed on the certificate.

(Sec. 13, 38 Stat. 1169, as amended; 46 U.S.C. 672)

[CGFR 54-22, 19 FR 4359, July 15, 1954]

§ 157.10-10 Assistant engineer.

(a) The term "assistant engineer" means a person holding a valid license as assistant engineer issued by the Coast Guard attesting to his competency and who may serve in such capacity within the restrictions placed upon the license.

(R.S. 4438, as amended, 4438a, as amended, 4441, as amended; 46 U.S.C. 224, 224a, 229)

[CGFR 54-22, 19 FR 4359, July 15, 1954]

§ 157.10–15 Chief engineer.

(a) The term "chief engineer" means any person responsible for the mechanical propulsion of a vessel and who is a holder of a valid license as chief engineer issued by the Coast Guard attesting to his competency, and who may serve in such capacity within the restrictions placed on the license.

(R.S. 4438, as amended, 4438a, as amended, 4441, as amended; 46 U.S.C. 224, 224a, 229)

[CGFR 54-22, 19 FR 4359, July 15, 1954]

§ 157.10–20 Deck crew.

(a) The term "deck crew, exclusive of licensed officers and apprentices" as used in section 13 of the Seamen's Act of 1915, as amended (46 U.S.C. 672) is construed as including only the following members of the deck department below the grade of licensed officer and above the grade of apprentice; viz. quartermasters, able seamen, and ordinary seamen.

(Sec. 13, 38 Stat. 1169, as amended; 46 U.S.C. 672)

§ 157.10–25 Licensed officer.

(a) The term "licensed officer" means any person holding a license issued by the Coast Guard which attests to the holder's competency to serve in the capacity described in the license on board vessels, such as master, mate, pilot, chief engineer, assistant engineer, or radio officer.

§ 157.10–30 Lifeboatman.

(a) The term "lifeboatman" means any person holding a certificate of efficiency issued by the Coast Guard attesting to his competency to serve as a lifeboatman.

(R.S. 4488, as amended; 46 U.S.C. 481)

§ 157.10–35 Master.

(a) A "master" means any person who is holder of a valid license as master issued by the Coast Guard attesting to his competency, and who may serve in such capacity within the restrictions placed on the license.

(R.S. 4438, as amended, 4438a, as amended, 4439, as amended; 46 U.S.C. 224, 224a, 226)

[CGFR 54-22, 19 FR 4359, July 15, 1954]

§ 157.10–40 Mate.

(a) The term "mate" means a person holding a valid license as mate issued by the Coast Guard attesting to his competency and who may serve in such capacity within the restrictions placed on the license.

(R.S. 4438, as amended, 4438a, as amended, 4440, as amended; 46 U.S.C. 224, 224a, 228)

[CGFR 54-22, 19 FR 4359, July 15, 1954]

§ 157.10–45 Ordinary seaman.

(a) The term "ordinary seaman" means any person holding a certificate of service as ordinary seaman issued by the Coast Guard and who may serve in such capacity on board vessels.

(Sec. 13, 38 Stat. 1169, as amended; 46 U.S.C. 672)

[CGFR 54-22, 19 FR 4359, July 15, 1954]

§ 157.10–50 Pilot.

(a) The term "pilot" means a person holding a valid license as pilot issued by the Coast Guard attesting to his competency and who may serve in such capacity within the restrictions placed on the license.

(R.S. 4438, as amended, 4442, as amended; 46 U.S.C. 224; 214)

[CGFR 54-22, 19 FR 4359, July 15, 1954]

§ 157.10-55 Qualified member of the engine department.

(a) The term "qualified member of the engine department" means any person holding a certificate of service as qualified member of the engine department issued by the Coast Guard attesting to his competency and who may serve in such capacity within the restrictions placed on the certificate.

(Sec. 13, 38 Stat. 1169, as amended; 46 U.S.C. 672)

[CGFR 54-22, 19 FR 4359, July 15, 1954]

§ 157.10-60 Radio officer.

(a) The term "radio officer" means a person holding a valid license as radio officer issued by the Coast Guard and who may serve in such capacity within the restrictions placed on the license.

(Sec. 3, 62 Stat. 233; 46 U.S.C. 229c)

[CGFR 54-22, 19 FR 4359; July 15, 1954]

§ 157.10-65 Sailors.

(a) The term "sailors" means those members of the deck department below the grade of licensed officer whose ordinary duties are incident to the mechanics of conducting the ship on her voyage, such as able seaman, ordinary seaman, quartermaster, lookout man, etc.

(Sec. 2, 38 Stat. 1164, as amended; 46 U.S.C. 673)

§ 157.10-70 Seaman.

(a) The term "seaman" is defined in R.S. 4612, as amended (46 U.S.C. 713), as follows:

> Every person (apprentice excepted) who shall be employed or engaged to serve in any capacity on board the same (vessel) shall be deemed and taken to be a "seaman".

§ 157.10-75 Staff officers.

(a) The term "staff officers" means persons in the Staff Department who hold certificates of registry as a (1) Chief Purser; (2) Purser; (3) Senior Assistant Purser; (4) Junior Assistant Purser; (5) Surgeon, or (6) Professional Nurse, which are issued by the Coast Guard.

(Sec. 1, 53 Stat. 1145, as amended; 46 U.S.C. 242)

[CGFR 52-43, 17 FR 9532, Oct. 18, 1952, as amended by CGFR 64-87, 30 FR 2028, Feb. 13, 1965]

§ 157.10-80 Tankerman.

(a) The term "tankerman" means any person holding a certificate of efficiency as tankerman issued by the Coast Guard attesting to his competency in the handling of inflammable or combustible liquid cargo in bulk or any person holding a valid license as master, mate, pilot or engineer.

(R.S. 4417a, as amended; 46 U.S.C. 391a)

[CGFR 54-22, 19 FR 4359, July 15, 1954]

§ 157.10-83 Operator of uninspected towing vessel.

The term "operator of uninspected towing vessels" means any person who is the holder of a valid license as operator of uninspected towing vessels issued by the Coast Guard attesting to his competency and who may serve in such capacity within the restriction placed on such license.

(R.S. 4427, as amended; 46 U.S.C. 405(b); 49 CFR 1.46(a)(3))

[CGD 72-132R, 38 FR 5750, Mar. 2, 1973]

§ 157.10-85 Second-class operator of uninspected towing vessels.

The term "Second-class operator of uninspected towing vessels" means any person who is the holder of a valid license as second-class operator of uninspected towing vessels issued by the Coast Guard attesting to his competency and who may operate such a towing vessel only when the holder of a valid license authorizing service as an operator of uninspected towing vessels is aboard.

(R.S. 4427, as amended; 46 U.S.C. 405(b); 49 CFR 1.46(a)(3))

[CGD 72-132R, 38 FR 5750, Mar. 2, 1973]

§ 157.10-87 Offshore supply vessel.

"Offshore supply vessel" means a vessel that

(a) Is propelled by machinery other than steam,

(b) Is not a passenger carrying vessel as defined by 46 U.S.C. 390,

(c) Is of more than fifteen and less than five hundred gross tons, and

(d) Regularly carries goods, supplies, or equipment in support of exploration, exploitation, or production of offshore mineral or energy resources.

[CGD 80-131, 45 FR 69242, Oct. 20, 1980]

Subpart 157.15—Manning Requirements

§ 157.15-1 Complement required by Certificate of Inspection.

(a) After inspecting a vessel pursuant to law and applicable regulations in this chapter, the Officer in Charge, Marine Inspection, shall specify in the Certificate of Inspection of all vessels except public nautical school ships the minimum complement of officers and crew necessary for the safe navigation of the vessels.

NOTE: Manning requirements for public nautical school ships are covered by § 167.60-15 of Subchapter R (Nautical Schools) of this chapter.

(b) The manning requirements for a particular vessel are determined by the Officer in Charge, Marine Inspection, after a thorough consideration of the applicable laws cited in § 157.01-10(b) and the regulations in this part together with the many factors involved, such as size, type, proposed routes of operation, cargo carried, type of business in which employed, etc.

(c) One of the criteria used for invocation of manning standards is the description of passenger vessels and public nautical school ships by relative sizes in gross tonnages. When it is determined under § 70.05-20 or § 167.01-8 of this chapter that a particular vessel has a Bureau of Customs' assigned gross register tonnage which is not indicative of the relative physical size of the vessel, the manning shall be that applicable to a vessel of the greater relative size.

[CGFR 61-14, 26 FR 3926, May 5, 1961]

§ 157.15-5 Changes in Certificate of Inspection.

(a) All applications for changes in certificates of inspection relative to crew requirements shall be made to the Officer in Charge, Marine Inspection at or nearest the port where the vessel actually is at the time the request is made.

(b) Where changes in an outstanding certificate of inspection are necessary the Officer in Charge, Marine Inspection, will issue an amendment to the certificate of inspection.

(R.S. 4421, as amended; 46 U.S.C. 399)

§ 157.15-10 Right of appeal.

(a) Whenever any person directly interested in or affected by any decision or action of any Officer in Charge, Marine inspection, shall feel aggrieved by such decision or action with respect to manning requirements, he may appeal therefrom to the Coast Guard District Commander having jurisdiction, and a like appeal shall be allowed from any decision or action of the Coast Guard District Commander to the Commandant, whose action shall be final; *Provided, however,* That such appeals shall be made in writing within 30 days after the decision or action appealed from shall have been rendered or taken; *And provided further,* That pending the determination of the appeal the crew, originally specified must be carried.

(R.S. 4463, as amended; 46 U.S.C. 222)

§ 157.15-15 Enforcement officers.

(a) In addition to collectors of customs, who are specifically designated by law as enforcement officers, all field officers and inspectors of the Coast Guard are designated as enforcement officers for the purpose of seeing that the provisions of section 2 of the Seamen's Act of 1915 as amended (38 Stat. 1164, as amended 46 U.S.C. 673), are complied with.

Subpart 157.18—Officers' Competency Certificates Convention, 1936

AUTHORITY: Interpret or apply R.S. 4438a, as amended; 46 U.S.C. 224a.

§ 157.18-1 Vessels subject to requirements of this subpart.

(a) Paragraph (1) of R.S. 4438a, as amended (46 U.S.C. 224a), states:

> (1) That the Officers' Competency Certificates Convention, 1936 (International Labor Organization Draft Convention Numbered

53, "concerning the minimum requirement of professional capacity for masters and officers on board merchant ships"), as ratified by the President on September 1, 1938, with understandings appended, and this section shall apply to all vessels, however propelled, navigating on the high seas, which are registered, enrolled and licensed, or licensed under the laws of the United States, whether permanently, temporarily, or provisionally, including yachts enrolled and licensed, or licensed with the exception of—

(a) Ships of war;

(b) Government vessels, or vessels in the service of a public authority, which are not engaged in trade;

(c) Wooden ships of primitive build, such as dhows and junks;

(d) Unrigged vessels;

(e) All vessels of less than two hundred gross tons.

(b) All vessels of the United States subject to R. S. 4438a, as amended (46 U.S.C. 224a) are subject to the requirements of this subpart.

[CGFR 54-43, 19 FR 6718, Oct. 19, 1954]

§ 157.18-5 Detention of vessel.

(a) The Collector of Customs, or the Coast Guard District Commander, by written order served upon the master or person in charge of a vessel, may detain any vessel of the United States which he has reason to believe is not in compliance with the requirements of R. S. 4438a, as amended (46 U.S.C. 224a), until he is satisfied that all officers employed aboard such vessel, who are required to be licensed by the Coast Guard, are in possession of the required licenses. If a vessel is detained by a written order of a Coast Guard District Commander, he should give immediate notice of such detention to the Collector of Customs from whose port the vessel will either clear or secure a permit to touch and trade in order that clearance or the issuance of a permit to touch and trade may be withheld.

[CGFR 54-43, 19 FR 6718, Oct. 19, 1954]

§ 157.18-10 Right of appeal.

Whenever a vessel is detained, the master may appeal, within five days to the Commandant, U.S. Coast Guard, who may, after investigation, affirm, set aside, or modify the order of detention.

[CGFR 54-43, 19 FR 6719, Oct. 19, 1954]

§ 157.18-15 Filing lists of officers with Collector of Customs.

The master of any vessel of the United States subject to the provisions of R.S. 4438a, as amended (46 U.S.C. 224a), shall, upon application for final clearance for foreign port or upon application for a permit to touch and trade, file with the Collector of Customs a complete list of the officers employed aboard the vessel and the Coast Guard serial number and description of license held by each officer.

[CGFR 54-43, 19 FR 6719, Oct. 19, 1954]

Subpart 157.20—Computations

§ 157.20-1 Vessels affected.

(a) All of the provisions of section 2 of the Seamen's Act of 1915, as amended (49 Stat. 1933; 46 U.S.C. 673), apply to all merchant vessels of the United States of more than 100 tons gross, excepting those navigating rivers, harbors, lakes (other than Great Lakes), bays, sounds, bayous, and canals, exclusively, and also insofar, as hours of labor on shipboard are concerned, to all tugs documented under the laws of the United States (except boats or vessels used exclusively for fishing purposes) navigating the Great Lakes, harbors of the Great Lakes and connecting and tributary waters between Gary, Indiana; Duluth, Minnesota; Niagara Falls, New York; and Ogdensburg, New York. The aforesaid section 2 does not apply to fishing or whaling vessels, yachts or to vessels engaged in salvage operations.

(Sec. 2, 38 Stat. 1164, as amended, sec. 7, 49 Stat. 1936, as amended; 46 U.S.C. 673, 689)

§ 157.20-5 Division into three watches.

(a) On vessels to which all of the provisions of section 2 of the Seamen's Act of 1915, as amended (49 Stat. 1933; 46 U.S.C. 673), apply, the licensed officers, sailors, coal passers, firemen, oilers, and water tenders shall, while at sea, be divided into at least 3 watches, the number in each watch to be as nearly equal as the division of the total number in each class will permit. The watches shall be kept on duty successively. The requirement for division into watches applies only to those classes of the crew specifically named in the aforesaid section 2: *Provided*, That in the case of radiotelegraph operators this requirement shall be applicable only when 3 or more radio officers are employed.

(b) Officers in Charge, Marine Inspection, will note that the 3-watch system extends to all licensed officers and to the sailors, coal passers, firemen, oilers, and water tenders, and will be governed accordingly in fixing the complement of licensed officers and crew, as authorized by 46 U.S.C. 222: *Provided*, That in the case of radio telegraph operators this requirement shall be applicable only when 3 or more radio officers are employed. 46 U.S.C. 673 does not apply to the licensed officers and crew of tugs, barges, and offshore supply vessels when engaged in voyages of less than 600 miles except with regard to coal passers, firemen, oilers, and water tenders. A voyage of less than 600 miles is construed as meaning the entire distance traversed in proceeding from the initial port of departure to the final port of destination, stops at intermediate ports while enroute not being considered as breaking the continuity of the voyage.

(R.S. 4421, as amended, 4463, as amended, sec. 2, 38 Stat. 1164, as amended, sec. 7, 49 Stat. 1936, as amended; 46 U.S.C. 399, 222, 673, 689)

[CGFR 52-43, 17 FR 9532, Oct. 18, 1952, as amended by CGD 80-131, 45 FR 69242, Oct. 20, 1980]

§ 157.20-10 Eight-hour day.

(a) No licensed officer or seaman in the deck or engine department of vessels to which all of the provisions of section 2 of the Seamen's Act of 1915, as amended (49 Stat. 1933; 46 U.S.C. 673), apply shall be required to be on duty more than 8 hours in any one day except under the extraordinary conditions mentioned in the aforesaid section 2, nor shall any licensed officer or seamen in the deck or engine department of any tug documented under the laws of the United States (except boats or vessels used exclusively for fishing purposes) navigating the Great Lakes, harbors of the Great Lakes, and their connecting and tributary waters between Gary, Indiana; Duluth, Minnesota; Niagara Falls, New York; and Ogdensburg, New York, be required or permitted to be on duty more than 8 hours in any one day, except in case of extraordinary emergency affecting the safety of the vessel and/or life or property.

(b) When the vessel is in a safe harbor, no seamen shall be required to do any unnecessary work on Sundays, New Year's Day, the Fourth of July, Labor Day, Thanksgiving Day, and Christmas Day, but this shall not prevent the dispatch of a vessel on regular schedule or when ready to proceed on her voyage.

(Sec. 2, 38 Stat. 1164, as amended, sec. 7, 49 Stat. 1936, as amended; 46 U.S.C. 673, 689)

[CGFR 52-43, 17 FR 9532, Oct. 18, 1952, as amended, by CGFR 69-116, 35 FR 6861, Apr. 30, 1970]

§ 157.20-15 Able seamen.

(a) *Vessels affected.* The provisions of U.S.C. 672, relating to able seamen, apply to all merchant vessels of the United States of 100 gross tons and upward except:

(1) Vessels navigating exclusively on rivers or the smaller inland lakes;

(2) Non-self-propelled vessels other than seagoing barges of one hundred gross tons or over, or barges which carry oil or any other hazardous material in bulk as cargo or residue; and,

(3) Tugs and towboats operating on bays and sounds connected directly with the ocean.

(b) *Number required.* (1) Except as indicated in paragraph (b)(2) of this section at least 65 percent of the deck crew, exclusive of licensed officers, shall be rated as able seamen.

(2) Tugs, barges and offshore supply vessels subject to the provisions of 46 U.S.C. 673 and engaged on a voyage of less than 600 miles shall have at least 50 percent of the deck crew, exclusive of licensed officers, rated as able seamen.

(c) *Type required.* (1) The total number of able seamen required on:

(i) Any vessel, may be made up of Able Seaman—Any Waters, Unlimited, ratings.

(ii) Any vessel of less than 1600 gross tons, or any vessel operating on the

Great Lakes and the Saint Lawrence River as far east as Sept Iles, may be made up of Able Seaman—Limited, ratings.

(iii) Any vessel of five hundred gross tons or less, or a barge, tug, or towboat, may be made up of Able Seamen—Special, ratings.

(iv) Any offshore supply vessel, or other vessel of less than five hundred gross tons engaged in support of exploration, exploitation, or production of offshore mineral or energy resources may be made up of Able Seamen—Special (OSV), ratings.

(2) Fifty percent of the total number of able seamen required on:

(i) Vessels other than those listed in paragraph (c)(1)(ii) of this section may be made up of Able Seaman—Limited, ratings.

(ii) Vessels other than those listed in paragraphs (c)(1)(iii) and (iv) of this section may be made up of Able Seaman—Special, ratings.

(3) In any case where Able Seamen—Limited, or Able Seaman—Special, ratings may constitute only a portion of the total number of able seamen required on board a vessel, at least 50 percent of the total number of able seamen required shall hold Able Seaman—Any Waters, Unlimited, ratings.

[CGD 80-131, 45 FR 69242, Oct. 20, 1980; 46 FR 41504, Aug. 17, 1981]

§ 157.20-20 Lifeboatmen.

(a) There shall be for each lifeboat or life raft a number of certificated lifeboatmen in accordance with the various regulations in Subchapter D (Tank Vessels), Subchapter H (Passenger Vessels), and Subchapter I (Cargo and Miscellaneous Vessels) of this chapter which specify the number required under various circumstances and conditions.

(R.S. 4417a, as amended, 4488, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 481, 367, 50 U.S.C. 198)

§ 157.20-25 Mates.

The minimum number of licensed mates required to be carried on every inspected ocean or coastwise seagoing merchant vessel propelled by machinery, and every inspected oceangoing vessel carrying passengers shall be as follows:

(a) Vessels of one thousand gross tons or more—three licensed mates.

(b) Vessels of one hundred gross tons or more, but less than one thousand gross tons—two licensed mates.

(c) Vessels of one thousand gross tons or more engaged in a run of less than four hundred miles from the port of departure to the port of final destination—two licensed mates.

(d) Offshore supply vessels engaged on a voyage of less than six hundred miles—one licensed mate.

[CGD 80-131, 45 FR 69242, Oct. 20, 1981]

§ 157.20-30 Master.

(a) Section 2 of the Act of March 3, 1913, as amended (37 Stat. 733, 46 U.S.C. 223) requires a master for every ocean and coastwise merchant vessel of the United States propelled by machinery and every oceangoing vessel subject to inspection and carrying passengers.

(b) The provisions of R.S. 4438, as amended (46 U.S.C. 224) require a master for every sail vessel of over 700 gross tons carrying passengers for hire.

(c) There shall be a duly licensed master on board every steam vessel of more than 150 gross tons when the vessel is underway on the Great Lakes, or bays, sounds, or lakes other than the Great Lakes, or rivers.

(d) There shall be a licensed master on board every seagoing motor vessel of 300 gross tons or over, subject to section 1 of the Act of June 20, 1936 (49 Stat. 1544, 1545; 46 U.S.C. 367), when the vessel is under way.

(e) For a steam vessel not exceeding 150 gross tons navigating the Great Lakes, or bays, sounds or lakes other than the Great Lakes, or rivers, a first class pilot or a second class pilot who has reached the age of 21 years may act as master.

(R.S. 4463, as amended, 4438; 46 U.S.C. 222, 224)

[CGFR 52-43, 17 FR 9532, Oct. 18, 1952, as amended by CGFR 69-116, 35 FR 6862, Apr. 30, 1970]

§ 157.20-32 Radar observers.

Every radar equipped vessel of 300 gross tons and over which is issued a certificate of inspection for navigation on any waters shall have in its required complement of deck officers, including the master, only those who have qualified as "radar observers". In addition, each person who is employed or serves as a pilot on board such a vessel in accordance with the requirements of federal law must be qualified as "radar observer". This requirement, insofar as it applies to pilots, becomes effective July 1, 1972. See § 10.05-46 of this chapter for "radar observer" requirements.

[CGFR 70-143, 35 FR 19962, Dec. 30, 1970]

§ 157.20-35 Engineers.

The Officer in Charge, Marine Inspection, shall determine the minimum number of licensed engineers required for the safe navigation of inspected vessels. Each determination must take into account:

(a) The statutory requirements of 46 U.S.C. 404, 404-1, 405, and 673;

(b) The regulatory requirements of § 157.20-37; and

(c) The type, horsepower, and degree of automation of the vessel's propulsion equipment.

[CGD 80-131, 45 FR 69243, Oct. 20, 1980]

§ 157.20-37 Chief engineer.

A licensed chief engineer shall be carried upon every:

(a) Steam propelled vessel;

(b) Seagoing mechanically propelled vessel of 200 gross tons and above documented under the laws of the United States.

[CGD 80-131, 46 FR 41504, Aug. 17, 1981]

§ 157.20-40 Pilot.

(a) The provisions of R.S. 4401, as amended (46 U.S.C. 364), require that every coastwise seagoing steam vessel subject to the navigation laws of the United States, not sailing under register, shall, when underway, except on the high seas, be under the control and direction of pilots licensed by the Coast Guard.

(b) The provisions of R.S. 4426, as amended (46 U.S.C. 404), requires a licensed pilot on every ferryboat, canal boat, yacht, or other small craft of like character propelled by steam, except for a motorboat subject to the act of April 20, 1940, as amended (54 Stat. 164-167; 46 U.S.C. 526-526t).

(c) The provisions of R.S. 4426, as amended (46 U.S.C. 404), requires a licensed pilot for a vessel of above 15 gross tons propelled by gas, fluid, naphtha, or electric motors, carrying passengers for hire, except for a motorboat subject to the act of April 25, 1940, as amended (54 Stat. 164-167; 46 U.S.C. 526-526t).

(d) The provisions of R.S. 4426, as amended (46 U.S.C. 404) requires a pilot on every vessel of above 15 gross tons propelled by gas, fluid, naphtha, or electric motors carrying freight for hire, except for a motorboat subject to the act of April 25, 1940, as amended (54 Stat. 164-167; 46 U.S.C. 526-526t).

(e)(1) For every inspected steam vessel of above 150 gross tons the navigation shall be under the control of a first class pilot when the vessel is underway on the Great Lakes, or bays, sounds, and lakes other than the Great Lakes, or rivers.

(2) For every inspected steam vessel not exceeding 150 gross tons the navigation shall be under the control of a first class or a second class pilot when the vessel is underway on the Great Lakes, or bays, sounds, and lakes other than the Great Lakes, or rivers; and a first class pilot or a second class pilot who has reached the age of 21 years, may act as master or pilot in charge of navigation.

(3) A second class pilot is authorized to act as pilot in charge of a watch on any steam vessel within the qualifications specified in his license.

(f) No person on or after July 1, 1972, shall serve as a pilot in accordance with the requirements of any federal law, on any radar equipped vessel of 300 gross tons and over navigating any waters who is not qualified as a "radar observer". See § 10.05-46 of this chapter for "radar observer" requirements.

(R.S. 4438, as amended, 4463, as amended; 46 U.S.C. 224, 222)

[CGFR 52-43, 17 FR 9535, Oct. 18, 1952, as amended by CGFR 70-143, 35 FR 19962, Dec. 30, 1970]

§ 157.20-45 Lookouts.

(a) The requirements for proper lookouts are in the various "Rules of the Road," i.e., Rule 29 of the "International Rules" (33 U.S.C. 147a), Article 29 of the "Inland Rules" (33 U.S.C. 221), Rule 28 of the "Great Lakes Rules" (33 U.S.C. 293) and Rule Numbered 26 of the "Western Rivers Rules" (33 U.S.C. 351).

[CGFR 59-41, 24 FR 7960, Oct. 2, 1959]

§ 157.20-50 Cabin watchmen and fire patrolmen.

(a) The requirements for cabin watchmen and fire patrolmen for passenger vessels are in §§ 78.30-10 to 78.30-20, inclusive, of Subchapter H (Passenger Vessels) of this chapter.

§ 157.20-55 Radio officers and radiotelegraph operators and watches.

(a) Radio officers and radiotelegraph operators and watches are required on certain merchant vessels of the United States. The details of the application of this requirement, as well as details regarding the licensing of such personnel, shall be as required by the statutes and regulations under the jurisdiction of the Federal Communications Commission and the statutes and regulations under the jurisdiction of the United States Coast Guard, regarding radio officers and radiotelegraph operators. (See Subchapter B (Merchant Marine Officers and Seamen) of this chapter.)

(R.S. 4463, as amended, sec. 1, 62 Stat. 232; 46 U.S.C. 222, 229a)

§ 157.20-60 Staff officers.

(a) When a staff department is carried on a passenger vessel subject to the act of August 1, 1939, as amended (53 Stat. 1145-1147, as amended; 46 U.S.C. 243-247), the qualifications of staff officers engaged shall be in accordance with that act.

Subpart 157.25—Language Requirements

§ 157.25-1 Vessels affected.

(a) Section 13 of the act of March 4, 1915, as amended (38 Stat. 1169, as amended; 46 U.S.C. 672), in part, provides as follows:

> No vessel of 100 gross tons and upward, except those navigating rivers exclusively and the smaller inland lakes and except as provided in section 1 of this act, shall be permitted to depart from any port of the United States unless she has on board a crew not less than 75 per centum of which, in each department thereof, are able to understand any order given by the officers of such vessel, * * *
>
> The collector of customs, may upon his own motion, and shall, upon the sworn information of any reputable citizen of the United States setting forth that this section is not being complied with, cause a muster of the crew of any vessel to be made to determine the fact; and no clearance shall be given to any vessel failing to comply with the provisions of this section.[12]

§ 157.25-5 Orders by officers.

(a) The Commandant construes the words "able to understand any order given by the officers of such vessel" to mean any orders that may be given to members of the crew in each department when directing the performance of their duties.

(b) The Commandant also construes this section 13 of the act of March 4, 1915, (38 Stat. 1169, as amended; 46 U.S.C. 672) as meaning only such orders as may be given to members of the crew in each department of the vessel in the course of the performance of their several duties. Among these duties, however, should be included lifeboat or emergency work. The Commandant would not consider it a proper construction of the section to require, for example, that a waiter should understand orders normal to the engine-room force or that a stoker should understand orders which related solely to the work of a deck hand or seaman. In the cases, however, of a waiter, a stoker, a seaman, or other employee on the vessel who was assigned to do emergency or lifeboat work it would be a proper construction of the section to require him to understand orders for such emergency or lifeboat service.

---

[12] Amended by section 1(d), 49 Stat. 1931, 46 U.S.C. 672(d) reading as follows: The collector of customs may, upon his own motion, and shall, upon the sworn information of any reputable citizen of the United States setting forth that this section is not being complied with, cause a muster of the crew of any vessel to be made to determine the fact, at which muster said reputable citizen must be present; and no clearance shall be given to any vessel failing to comply with the provisions of this section.

(Sec. 7, 49 Stat. 1936, as amended; 46 U.S.C. 689)

§ 157.25-10 Muster of crew for language test.

(a) When the collector of customs musters the crew on any vessel, either upon his own motion or upon the sworn information of any reputable citizen, for the purpose of determining that 75 percent of the crew in each department is able to understand any order given by the officer of such vessel, the Commandant is of the opinion that a demonstration of such understanding shall be made in the presence of the collector of customs or his authorized representative.

(b) To determine the fact of understanding, the Commandant is of the opinion that the law requires that orders be given to the individual members of the crew by the officers of the ship, and in the language ordinarily and customarily used by such officers in navigating and operating the ship. The orders should be given directly by the officers to each member of the crew, and not through an interpreter or interpreters; signs, gestures or signals should not be used in making the test. The collector of customs or his representative should suggest to the officers of the vessel the orders to be given, which should touch upon matters ordinarily arising in the daily routine work of the crew in each department, as well as orders involving fire drills, boat drills, the handling of boats, and orders involving any emergencies that may be expected to arise in handling, operating, or navigating the ship.

(c) The muster of the crew for which the law provides shall take place at such reasonable times and occasions as will determine the facts sufficiently in advance of the time fixed for the sailing of the vessel to permit the engaging of such new members of the crew as may be necessary in time for the vessel to sail without delay. As the law requires the application for muster to be made at least 6 hours before the vessel departs or is scheduled to depart, thus indicating an intent not unduly to delay the sailing of vessels, the muster must be conducted with such promptness and expedition as to constitute full compliance with this manifest purpose of the law. Whenever the language test applied at the muster results in the rejection of any member of the crew and the substitution of another seaman in his place at such time as to render it impracticable for a second muster to be requested in the manner specified in this section, then and in that case it shall be the duty of the customs collector to see that any seaman signed on the articles of the ship to take the place of the rejected man is capable of passing such test. The Commandant understands the law to require the safeguarding of the vessel through the language test by such means at such times and in such a manner as shall be helpful and not hurtful to our maritime commerce and that it is in no sense intended to be used to create embarrassment or to cause unnecessary expense or delay.

(Sec. 13, 38 Stat. 1169, as amended, sec. 7, 49 Stat. 1936, as amended; 46 U.S.C. 672, 689)

Subpart 157.30—Special Provisions

§ 157.30-1 Manning of seagoing barges.

(a) The determination as to whether a seagoing barge shall be manned or not shall be made by the Officer in Charge Marine Inspection. Permission may be granted for such barges to operate unmanned when in the opinion of the Officer in Charge, Marine Inspection manning is not necessary for the safe operation of the vessel and where it appears that the requirements of the rules as to lights, etc., will be met. In any case the certificate of inspection will specify whether or not the barge is to be manned, the number and grade of the crew, when carried, and the conditions of operation when no crew is required. These conditions may include limitations as to loading, route, cargo, season of operation, etc.

(R.S. 4463, as amended, sec. 10, 35 Stat. 428, as amended; 46 U.S.C. 222, 395)

§ 157.30-5 Tank vessels.

(a) The requirements for manning tank vessels is in Parts 31 and 35 of Subchapter D (Tank Vessels) of this chapter.

(R.S. 4417a, as amended; 46 U.S.C. 391a)

§ 157.30-7 Passenger vessels of not more than 65 feet in length.

(a) Regulations governing manning requirements on inspected passenger vessels of not more than 65 feet in length are contained in Part 186 of Subchapter T of this chapter.

(Sec. 3, 70 Stat. 152; 46 U.S.C. 390b)

[CGFR 58-8, 28 FR 2609, Apr. 19, 1958]

§ 157.30-10 Officers for uninspected vessels.

(a) For the purpose of this section and R.S. 4438a, as amended (46 U.S.C. 224a), the definitions of the following expressions, which are the same as those set forth in Article 2 of the Officers' Competency Certificates Convention, 1936, are:

(1) "Master" means any person having command or charge of a vessel.

(2) "Navigating officer in charge of the watch" means any person, other than a pilot, who is for the time being actually in charge of the navigation or maneuvering of a vessel.

(3) "Chief engineer" means any person permanently responsible for the mechanical propulsion of a vessel.

(4) "Engineer officer in charge of the watch" means any person who is for the time being actually in charge of the running of a vessel's engines.

(b) Every vessel, however propelled, 200 gross tons or over and navigating the high seas and subject to the provisions of R.S. 4438a, as amended (46 U.S.C. 224a), shall have officers licensed by the Coast Guard. No person shall be engaged to perform or shall perform on board any such vessel the duties of master, chief engineer, navigating officer in charge of the watch, or engineer officer in charge of the watch unless he holds a valid license issued by the Coast Guard attesting to his qualifications to perform such duties.

(R.S. 4438a, as amended; 46 U.S.C. 224a)

[CGFR 66-33, 31 FR 15296, Dec. 6, 1966, as amended by CGD 78-027, 46 FR 27654, May 21, 1981]

§ 157.30-15 Deck officers for steam or motor vessels operating under special conditions.

(a) The master, mates, and pilots of a steam vessel, or a sail vessel, or a vessel propelled by internal-combustion engines of 200 gross tons and over navigating exclusively in and around the Hawaiian Islands may be holders of special valid licenses issued by the Coast Guard for such service.

(b) The master, mates, and pilots of a steam or sail vessel or a seagoing motor vessel of 200 gross tons or over navigating exclusively between ports of the Island of Puerto Rico may be holders of special valid licenses issued by the Coast Guard for such service.

(c) The master, mate, and pilot of a steam pilot vessel, or seagoing motor pilot vessel of 200 gross tons or over, or of a steam vessel navigating the waters of the whaling grounds in the Alaskan seas or of a steam vessel engaged exclusively in the business of whale fishing, or of a steam vessel engaged in the Atlantic, Pacific, or Gulf Coast fisheries, may be holders of special valid licenses issued by the Coast Guard for such service.

(d) For a vessel navigating exclusively in Alaska and subject to the provisions of the Act of March 4, 1907, as amended (34 Stat. 1411, 46 U.S.C. 237), the master and pilots may be Indians holding special valid licenses issued by the Coast Guard.

(R.S. 4438, as amended, 4438a, as amended, sec. 1, 34 Stat. 1411, secs. 1, 2, 49 Stat. 1544, 1545, as amended; 46 U.S.C. 224, 224a, 237, 367)

§ 157.30-20 Engineers for steam or motor vessels operating under special conditions.

(a) For seagoing vessels propelled by internal combustion engines navigating exclusively between ports in the

Hawaiian Islands, or navigating exclusively between ports of the Island of Puerto Rico and/or the Virgin Islands, the engineers may be holders of special valid licenses issued by the Coast Guard for such service.

(b) For a vessel navigating exclusively in Alaska and subject to the provisions of the act of March 4, 1907, as amended (34 Stat. 1411, 46 U.S.C. 237), the engineers may be Indians holding special valid licenses issued by the Coast Guard.

(R.S. 4438, as amended, 4438a, as amended, sec. 1, 34 Stat. 1411, secs. 1, 2, 49 Stat. 1544, 1545, as amended; 46 U.S.C. 224, 224a, 237, 367)

§ 157.30-25 Vessels carrying persons in addition to crew.

(a) A steam vessel engaged in towing, or a steam vessel engaged in fishing or oyster planting or dredging, on the Great Lakes, and all inland waters (including rivers), may be authorized by the Coast Guard District Commander to carry on board such number of persons in addition to its crew as shall be deemed necessary to carry on the legitimate business of such vessel. The number of extra persons so carried shall not be in excess of the proportion of one such person to each net ton of measurement of the vessel and shall not be carried for hire.

(Sec. 1, 24 Stat. 129, as amended; 46 U.S.C. 458)

§ 157.30-30 Licensed operators for uninspected vessels subject to the act of April 25, 1940, as amended.

(a) Every motorboat, as defined by the act of April 25, 1940, as amended (46 U.S.C. 526), and any other vessel of fifteen gross tons or less propelled by machinery other than steam, while carrying passengers for hire, shall be duly licensed for such service by the Coast Guard. This licensed operator shall be in charge of such motorboat or vessel, regardless of whether or not the passengers carried for hire are on such motorboat or vessel or are carried on a non-self-propelled vessel being towed or pushed by such motorboat or vessel.

(b) A license as master, chief mate, second mate or third mate of ocean and coastwise inspected vessels or a license as ocean operator issued under the act of May 10, 1956 (70 Stat. 151-154, 46 U.S.C. 390-390g) will authorize the holder to serve as an operator of a motorboat, or other vessel of fifteen gross tons or less, propelled by machinery other than steam, under the Act of April 25, 1940, as amended, on the class vessel, waters, and within other restrictions in his license.

(c) A license as master, mate or pilot of inspected vessels on waters other than ocean and coastwise waters, or a license as master, mate or pilot of yachts on the Great Lakes, other lakes, bays and sounds or rivers, or a license as operator issued under the act of May 10, 1956, will authorize the holder to serve as an operator of a motorboat, or other vessel of fifteen gross tons or less propelled by machinery other than steam, under the act of April 25, 1940, as amended, on the class vessel, waters, and within other restrictions in his license.

(d) Operation of vessels by licensed personnel on routes and in capacities lower than those described on the license held will be permitted as provided in Table 157.30-30(d) without obtaining additional license for the lower route or capacity.

(Interpret or apply R.S. 4426, as amended sec. 7, 17, 54 Stat. 165, 166, as amended; 46 U.S.C. 404, 526f, 526p)

[CGFR 61-23, 26 FR 5758, June 28, 1961]

TABLE 157.30–30(d)

Type license held	Route described on license	Capacity and routes permitted
Ocean Operator,[1] Master,[1] or Mate[1].	Oceans or coastwise	Can serve as operator of an uninspected motorboat, or other uninspected vessel of fifteen gross tons or less, on specified route described on license and on Great Lakes, lakes, bays and sounds, and rivers.
	Waters other than ocean or coastwise.	Can serve as operator of an uninspected motorboat, or other uninspected vessel of fifteen gross tons or less, on Great Lakes, lakes, bays and sounds, and rivers.
	Great Lakes	Can serve as operator of an uninspected motorboat, or other uninspected vessel of fifteen gross tons or less, on specific route described on license, and on lakes, bays and sounds and rivers.
Operator[1] or Master[1]	Lakes, bays and sounds.	Can serve as operator of an uninspected motorboat, or other uninspected vessel of fifteen gross tons or less, on specific route described on license, and on rivers.
	Rivers	Can serve as operator of an uninspected motorboat, or other uninspected vessel of fifteen gross tons or less, on the specific route described on license.
	Specific bodies of water.	Can serve as operator of an uninspected motorboat, or other uninspected vessel of fifteen gross tons or less, only on the specific waters described.
Pilot	Specific bodies of water.	Can serve as operator of an uninspected motorboat, or other uninspected vessel of fifteen gross tons or less, on the Great Lakes, lakes, bays and sounds, and rivers.

[1] Only those licenses which authorize service on inspected passenger vessels which are mechanically propelled may be substituted for an operator's license.

§ 157.30–35 Vessels of over 65 feet in length and less than 100 gross tons.

(a) A license as ocean operator or operator of mechanically propelled passenger-carrying vessels will authorize the holder to serve as master, pilot, or person in charge of any steam or motor vessel of over 65 feet in length and less than 100 gross tons, to the same extent that such license authorizes the holder to operate passenger-carrying vessels of not more than 65 feet in length and less than 100 gross tons.

(Interpret or apply R.S. 4426, as amended; 4438, as amended, 4463, as amended, secs. 1, 9, 49 Stat. 1544, 1545, as amended; 46 U.S.C. 404, 224, 222, 367)

[CGFR 59-56, 24 FR 10257, Dec. 18, 1959]

§ 157.30–40 Vessels not more than 1,000 gross tons.

For the purposes of § 157.20–40, a person holding a license as master or mate is a licensed pilot of a vessel of not more than 1,000 gross tons, within the limitation and restriction of his license, on which he is employed as master or mate.

(46 U.S.C. 222, 224, 364, 367, 404)

[CGFR 72-3, 37 FR 528, Jan. 13, 1972]

§ 157.30–45 Uninspected towing vessels operator's license.

(a) An uninspected towing vessel, as defined in R.S. 4427, as amended (86 Stat. 423; 46 U.S.C. 405(b)), shall, while underway, be under the actual direction and control of a person licensed by the Coast Guard as an operator of uninspected towing vessels.

(b) An uninspected towing vessel may, while underway, be under the actual direction and control of a person licensed by the Coast Guard as a Second-class operator of uninspected towing vessels, if the holder of a license as operator of uninspected vessels is also aboard.

(R.S. 4427, as amended; 46 U.S.C. 405(b); 49 CFR 1.46(o)(3))

[CGD 72-132R, 38 FR 5750, Mar. 2, 1973]

Subpart 157.35—Special Duties of Pilots and Inland Mates

§ 157.35–1 Pilots governed by rules.

(a) Pilots of steam vessels, while in the discharge of their duties, shall be governed by the rules of the Commandant made for their guidance, and not by any instructions emanating from any inspector or other person.

§ 157.35-5 Duties of mates of inland steam vessels.

(a) It shall be the duty of the mate of every inland steamer carrying passengers to assign to deck or steerage passengers the space they may occupy on board during the voyage, and to supervise the stowage of freight or cargo, and see that the space set apart for passengers is not encroached upon. He shall also carefully examine all marks on packages of freight delivered on board for shipment, with a view to detect and prevent any combustible or other dangerous articles prohibited by law being delivered on board.

[CGFR 52-43, 17 FR 9536, Oct. 18, 1952, as amended by CGFR 65-16, 30 FR 10897, Aug. 21, 1965]

BLANK PAGE

INDEX

SUBCHAPTER P—MANNING OF VESSELS

Section

Able seaman:
  Computation of number required ... 157.20-15
  Definition ... 157.10-5
Alaska, vessels navigating exclusively in:
  Deck officers ... 157.30-15
  Engineers ... 157.30-20
Appeal, right of ... 157.15-10, 157.18-10
Application of regulations ... Subpart 157.05
Assignment of functions ... 157.01-5
Assistant engineer ... 157.10-10, 157.30-10
Authority and purpose ... Subpart 157.01
Barges, seagoing ... 157.30-1
Cabin watchmen ... 157.20-50
Certificate of Inspection:
  Changes in ... 157.15-5
  Complement required by ... 157.15-1
Chief engineer ... 157.10-15, 157.30-10(a)
Computations ... Subpart 157.20
Deck crew ... 157.10-20, 157.20-15(b)
Detention of vessel ... 157.18-5
Enforcement officers ... 157.15-15
Engineer:
  Assistant ... 157.10-10, 157.30-10(c)
  Chief ... 157.10-15, 157.30-10(a)
Engineer officer in charge of the watch ... 157.30-10
Engineers:
  Number required ... 157.20-35
  Vessels operating under special conditions ... 157.30-20
Fire Patrolmen ... 157.20-50
Hawaiian Islands, Vessels operating exclusively in and around:
  Deck officers ... 157.30-15
  Engineers ... 157.30-20
Language requirements ... Subpart 157.25
Lifeboatman ... 157.10-30, 157.20-20
Lookouts ... 157.20-45
Master:
  As pilot of vessel not more than 1,000 gross tons ... 157.30-40
  Definition ... 157.10-35, 157.30-10(a)
  Where required ... 157.20-30
Mate:
  As navigating officer in charge of the watch ... 157.30-10(c)
  As pilot of vessel not more than 1,000 gross tons ... 157.30-40
  Definition ... 157.10-40
  Of inland stream vessel carrying passengers ... 157.35-5
Motorboats: *see* Uninspected vessels.
  Navigating officer in charge of the watch ... 157.30-10
  Non-crewmembers, carriage of ... 157.30-25
  Officer, licensed ... 157.10-25

Section
Officers' Competency Certificates Convention, 1936:
  General .... Subpart 157.18
  Uninspected vessels, application to 157.30-10
Officers:
  List to be filed with Collector of Customs 157.18-15
  Staff, on passenger vessels 157.20-60
  Uninspected vessels 157.30-10
  Vessels operating under special conditions 157.30-15, 157.30-20
Operator of uninspected towing vessels 157.10-83, 157.30-45
Ordinary seaman, definition 157.10-45
Passenger vessels:
  Cabin watchman and fire patrolman 157.20-50
  Inspected, of not more than 65 feet 157.30-7
  Staff officers 157.20-60
Pilot:
  Acting as master .... 157.20-30(e)
  Definition 157.10-50
  Duty of 157.35-1
  On vessels not more than 1,000 gross tons 157.30-40
  Where required 157.20-40
Puerto Rico, vessels operating exclusively between ports of:
  Deck officers 157.30-15
  Engineers 157.30-20
Qualified members of the engine department, definition 157.10-55
Radar observers .... 157.20-32, 157.20-40(f)
Radio officer:
  Definition 157.10-60
  Watches 157.20-5, 157.20-55
  Where required 157.20-55
  Radiotelegraph operators 157.20-5, 157.20-55
  Sailors 157.10-65
  Seagoing barges 157.30-1
  Seaman 157.10-70
Seamen's Act of 1915:
  Able seamen required 157.20-15
  Enforcement officers 157.15-15
Language requirements .... Subpart 157.25
Vessels affected 157.20-1, 157.20-15, 157.25-1
Watches 157.20-5
Workday 157.20-10
Second-class operator of uninspected towing vessels 157.10-85, 157.30-45
Staff officers:
  Definition 157.10-75
  On passenger vessels 157.20-60
Tankerman 157.10-80
Tank vessels 157.30-5
Uninspected towing vessels:
  Operator 157.10-83, 157.30-45
  Second-class operator 157.10-85, 157.30-45
Uninspected vessels:
  Authority for regulations .... 157.01-10(c)
  Officers for 157.30-10
  Subject to Act of April 25, 1940 .... 157.30-30
  Watches .... 157.30-10(c)
Virgin Islands: *see* Puerto Rico: engineers.
  Watches .... 157.20-5, 157.30-10(c)
  Workday 157.20-10

SUBCHAPTER Q—EQUIPMENT, CONSTRUCTION, AND MATERIALS: SPECIFICATIONS AND APPROVAL

PART 159—APPROVAL OF EQUIPMENT AND MATERIALS

Subpart 159.001—General

Sec.
159.001-1 Purpose.
159.001-3 Definitions.
159.001-5 Correspondence and applications.
159.001-7 Substituted procedures.

Subpart 159.005—Approval Procedures

159.005-1 Purpose.
159.005-3 Application for preapproval review.
159.005-5 Preapproval review: Contents of application.
159.005-7 Preapproval review: Coast Guard action.
159.005-9 Approval inspections and tests.
159.005-11 Approval inspection or test report: Contents.
159.005-12 Plans.
159.005-13 Equipment or material: Approval.
159.005-15 Approval of equipment or material: Suspensions, withdrawals, and terminations.

Subpart 159.007—Production Inspection and Tests of Approved Equipment and Materials

159.007-1 Purpose.
159.007-3 Production inspections and tests: Independent laboratory's procedures.
159.007-5 Production inspections and tests: Application for acceptance.
159.007-7 Application for acceptance for production inspections and tests: Coast Guard action.
159.007-9 Production inspections and tests.
159.007-11 Production inspections and tests: Yearly report.
159.007-13 Production inspections and tests: Records.

Subpart 159.010—Independent Laboratory: Acceptance, Listing, and Termination

159.010-1 Purpose.
159.010-3 Independent laboratory: Standards for acceptance.
159.010-5 Independent laboratory: Application for acceptance.
159.010-7 Independent laboratory: Standards for listing.
159.010-9 Independent laboratory: Application for listing.
159.010-11 Independent laboratory: Listing in subpart.
Sec.
159.010-15 Contracting inspections and tests or transferals to another laboratory or person.
159.010-17 Application and test plans: Changes.
159.010-19 Termination of acceptance or listing of an independent laboratory.
159.010-21 Termination of acceptance or listing: Procedure.

AUTHORITY: Sec. 1, 73 Stat. 475 (46 U.S.C. 481); sec. 201 86 Stat 427, as amended (46 U.S.C. 391a); sec. 6(b)(1), 80 Stat 937 (49 U.S.C. 1655(b)(1)); 49 CFR 1.46 (b) and (n)(4).

SOURCE: 44 FR 73043, Dec. 17, 1979, unless otherwise noted.

Subpart 159.001—General

§ 159.001-1 Purpose.

(a) This part contains the procedures for the approval of equipment and materials when that equipment or material is inspected or tested by an independent laboratory or by the manufacturer of the equipment or material.

§ 159.001-3 Definitions.

(a) As used in this part:

(1) "Applicable subpart" means a subpart under which equipment or material is approved, or under which an independent laboratory is listed.

(2) "Listed laboratory" means an independent laboratory that has been listed in an applicable subpart under the provisions of § 159.010-11.

(3) "Test plan" means a description of the procedures by which an independent laboratory meets or exceeds the inspection and test requirements of an applicable subpart.

§ 159.001-5 Correspondence and applications.

(a) Unless otherwise specified, all correspondence and applications in connection with the approval and testing of equipment and materials shall be addressed to: Commandant (G-MMT-3/TP12), U.S. Coast Guard, Washington, D.C. 20593.

§ 159.001-7 Substituted procedures.

(a) The Commandant may substitute the procedures in this part for the procedures in any other part of this subchapter. Each person known to be affected by the substitution shall be informed that the procedures in this part apply.

Subpart 159.005—Approval Procedures

§ 159.005-1 Purpose.

(a) This subpart contains the procedures by which the Coast Guard approves equipment and materials under other subparts of this subchapter that require—

(1) Preapproval inspections and tests by an independent laboratory;

(2) Preapproval inspections and tests by the manufacturer; or

(3) No preapproval inspections or tests.

§ 159.005-3 Application for preapproval review.

(a) Each manufacturer of equipment or material who seeks Coast Guard approval under an applicable subpart must submit an application that meets § 159.005-5 to the Commandant unless—

(1) The subpart contains a list of independent laboratories;

(2) The subpart does not require Coast Guard review prior to testing; and

(3) The manufacturer meets the requirements of paragraph (b) of this section.

(b) If the applicable subpart contains a list of independent laboratories and does not specifically require preapproval review by the Coast Guard, the manufacturer may have the tests performed by a listed laboratory and submit the report required by § 159.005-11 to the Commandant.

§ 159.005-5 Preapproval review: Contents of application.

(a) Each application must contain the following:

(1) The name and address of the manufacturer and the factory where the finished equipment or material is produced.

(2) One or more of the following as required by the applicable subpart:

(i) Two sets of general plans of the equipment or material.

(ii) Two sets of specifications of the equipment or material.

(iii) A sample of the equipment or material accompanied by a written description of its components.

(3) A statement signed by the manufacturer or the manufacturer's representative, that an official representative of the Coast Guard is allowed access to the place of manufacture and to the place of test to verify the information submitted in the application or to witness tests.

(b) If the equipment or material is required by the subpart to be inspected and tested by an independent laboratory, the application must contain the following additional information:

(1) The name and address of a laboratory that meets § 159.010-3(a) and that is selected by the manufacturer to perform or supervise the inspections and tests.

(2) If the laboratory has not been accepted previously for inspecting and testing the manufacturer's equipment or material under the applicable subpart, the completed application under § 159.010-5(a).

§ 159.005-7 Preapproval review: Coast Guard action.

(a) If approval inspections and tests are required under the applicable subpart, the Commandant takes the following action:

(1) If the Commandant determines from the application that the equipment or material appears to meet the design requirements of an applicable subpart or appears to have equivalent performance characteristics, and that the laboratory meets § 159.010-3(a), the Commandant informs the manufacturer that the required approval inspections and tests may be conducted.

(2) If the Commandant determines from the application for approval that the equipment or material does not appear to meet the design requirements of an applicable subpart or does not appear to have equivalent performance characteristics, or that the laboratory does not meet § 159.010-

3(a), the Commandant informs the manufacturer of the reason why the equipment or material is not acceptable for approval inspections and tests or why the laboratory is not accepted.

(b) If no approval inspections or tests are required under the applicable subpart, the Commandant—

(1) Takes action in accordance with § 159.005-13; or

(2) Informs the manufacturer of additional information required before action under § 159.005-13 can be taken.

§ 159.005-9 Approval inspections and tests.

(a) Each manufacturer of equipment or material that is required to be subjected to approval inspections and tests must—

(1) If the applicable subpart requires the equipment or material to be inspected or tested, have the approval inspections or tests performed;

(2) If the applicable subpart requires the equipment or material to be inspected or tested by an independent laboratory, insure that a laboratory accepted by the Commandant performs or supervises the approval inspections or tests;

(3) Bear all costs of the approval inspections and tests;

(4) If requested, advise the Commandant of the time, date, and place of each approval inspection or test, or both, before the inspection or test is performed; and

(5) After completion of the approval inspections and tests, submit to the Commandant—

(i) A test report that meets § 159.005-11;

(ii) At least two sets of specifications of the materisl as inspected or tested or at least two sets of plans of the equipment as inspected or tested that meet § 159.005-12; and

(iii) A description of the quality control procedures that will be in effect during the production of the equipment or material.

§ 159.005-11 Approval inspection or test report: Contents.

(a) Each approval inspection or test report must contain the following:

(1) The name of the manufacturer.

(2) If the inspections or tests are performed or supervised by an independent laboratory, the name and address of the laboratory.

(3) The trade name, product designation (such as model numbers), and a brief description of the equipment or material inspected or tested.

(4) The time, date, and place of each approval inspection and test.

(5) The name and title of each person performing, supervising, and witnessing the approval inspections or tests.

(6) The performance data for each test required in the applicable subpart, including a description of each failure.

(7) A description or photographs of the procedures and apparatus used in the inspections or tests, or a reference to another document that contains an appropriate description or photographs.

(8) At least one photograph that shows an overall view of the equipment or material submitted for approval and other photographs that show—

(i) Design details; and

(ii) Each occurrence of damage or deformation to the equipment or material that occurred during the approval tests.

(b) Each inspection or test report must bear an attestation that the inspections or tests were conducted as required by the applicable subpart and that the report contains no known errors, omissions, or false statements. The attestation must be signed by:

(1) The manufacturer or manufacturer's representative, if the inspection or tests are conducted by the manufacturer; or

(2) The chief officer of the laboratory, or the chief officer's representative, if the inspection or tests were conducted by an independent laboratory.

NOTE: A false representation on a report is a ground for suspension or withdrawal of approval of the equipment or material. A false representation is also punishable as a crime under 18 U.S.C. 1001.

§ 159.005-12 Plans.

(a) Each set of plans under § 159.005-9(a)(5)(ii) for equipment must include the following:

(1) An assembly drawing or general arrangement drawing.

(2) A description of each component of the equipment that includes the name, the manufacturer, and the part identification of each component in—

(i) A detail drawing;

(ii) A bill of material or parts list; or

(iii) A specification for that component.

(3) A list of the drawings and specifications in the set of plans, including each revision, and the date of that list.

(4) If a manufacturer's instructions or manual is required in the applicable subpart, a copy of the instructions or manual.

§ 159.005-13 Equipment or material: Approval.

(a) If from analysis of the material and data required to be submitted under this subpart, the Commandant determines that the equipment or material meets the applicable subpart, the Commandant—

(1) Approves the equipment or material;

(2) Issues a certificate of approval to the manufacturer under § 2.75-5 of this chapter;

(3) Retains one set of approved plans and returns all others to the manufacturer; and

(4) Publishes a notice of the approval in the FEDERAL REGISTER.

(b) If from analysis of the material and data submitted the Commandant determines that the equipment or material does not meet the applicable subpart, the Commandant informs the manufacturer of the reason why that equipment or material does not meet the subpart.

(c) If an independent laboratory performs the approval inspections or tests, the Commandant will notify the laboratory of the actions taken under paragraph (a) or (b) of this section, unless the manufacturer specifically requests that the laboratory not be notified.

§ 159.005-15 Approval of equipment or material: Suspensions, withdrawals, and terminations.

(a) The Commandant suspends an approval issued under this subchapter in accordance with § 2.75-40 of this chapter, withdraws an approval issued under this subchapter in accordance with § 2.75-50(a) of this chapter, and terminates an approval issued under this subchapter in accordance with § 2.75-50(b) of this chapter.

Subpart 159.007—Production Inspection and Tests of Approved Equipment and Materials

§ 159.007-1 Purpose.

(a) This subpart contains the procedures under which production inspections and tests of approved equipment or materials are to be performed under this subchapter.

§ 159.007-3 Production inspections and tests: Independent laboratory's procedures.

(a) The manufacturer may follow an independent laboratory's procedures for production inspections and tests if those procedures—

(1) Meet or exceed the production inspection and test requirements of the applicable subpart or are equivalent to those inspections and tests;

(2) Include labeling or marking the equipment or material when the equipment or material meets the inspection and test procedures of the laboratory; and

(3) Are accepted by the Commandant under § 159.007-7(b).

§ 159.007-5 Production inspections and tests: Application for acceptance.

(a) If the applicable subpart requires production inspections and tests by an independent laboratory, the manufacturer must select a laboratory and submit an application for acceptance that meets § 159.010-5(a) unless the laboratory—

(1) Is listed in the subpart; or

(2) Is accepted by the Commandant for approval inspections and tests of the equipment or material under § 159.005-7(a)(1).

(b) If the manufacturer wants to follow the laboratory's procedures for production inspections and tests instead of meeting the Coast Guard procedures under this subchapter, the application must contain a description of those procedures.

§ 159.007-7 Application for acceptance for production inspections and tests: Coast Guard action.

(a) From the information submitted with the application, the Commandant determines whether or not the laboratory is accepted for production inspections and tests. The Commandant informs the manufacturer of the results of this determination, if the Commandant does not accept a laboratory, the reason for the disapproval will be given.

(b) From the description of the laboratory's procedures for production inspections and tests, the Commandant determines whether or not those procedures are accepted. The Commandant informs the manufacturer of the results of this determination. If the Commandant does not accept the laboratory's procedures, the reasons why they are not accepted will be given.

§ 159.007-9 Production inspections and tests.

(a) If the applicable subpart requires the production inspections and tests to be performed or supervised by an independent laboratory, the manufacturer shall insure that all required production inspections and tests are performed or supervised by an independent laboratory accepted by the Commandant.

(b) If the applicable subpart does not require an independent laboratory to perform the production inspections and tests, the manufacturer shall have those inspections and tests performed.

(c) Unless alternative procedures have been accepted by the Commandant under § 159.007-3 each production inspection and test must be performed or supervised in accordance with the applicable subpart.

§ 159.007-11 Production inspections and tests: Yearly report.

(a) When the manufacturer uses the production inspection and test procedures in an applicable subpart he must submit a yearly report. The report is not required when inspection and test procedures approved under § 159.007-3 are used.

(b) The report must include the following:

(1) A list of all inspections and tests performed;

(2) A summary of the results of each group of inspections or tests;

(3) A detailed description of any test failures; and

(4) A statement whether or not all required tests were performed.

§ 159.007-13 Production inspections and tests: Records.

(a) The manufacturer must have a completed record with the following information for each production inspection and test:

(1) The time, date and place of each inspection and test.

(2) The name and title of each person performing, supervising and witnessing the inspections or tests.

(3) The performance data for each test required in the applicable subpart, including a description of each failure.

(4) A description or photographs of the procedures and apparatus used in the inspections or tests.

(b) The manufacturer must retain each record under this section for at least 60 months after the month in which the inspection or test was conducted.

(c) The records must be made available for examination by the Commandant upon request.

Subpart 159.010—Independent Laboratory: Acceptance, Listing, and Termination

§ 159.010-1 Purpose.

(a) This subpart contains the following:

(1) The standards under which the Coast Guard accepts an independent laboratory that a manufacturer proposes to use.

(2) The standards and procedures under which a laboratory is listed in applicable subparts for tests and inspections required by that subpart.

(3) The circumstances under which the acceptance or listing of a laboratory is terminated.

§ 159.010-3 Independent laboratory: Standards for acceptance.

(a) To be accepted by the Coast Guard as an independent laboratory, a laboratory must—

(1) Be engaged, as a regular part of its business, in performing inspections and tests that are the same as or similar to the inspections and tests required in the applicable subpart;

(2) Have or have access to the apparatus, facilities, personnel, and calibrated instruments that are necessary to inspect and test the equipment or material under the applicable subpart;

(3) Not be owned or controlled by—

(i) The manufacturer of the equipment or material to be inspected or tested under this subchapter or any manufacturer of similar equipment or material;

(ii) A vendor of the equipment or material to be inspected or tested under this subchapter or a vendor of similar equipment or material; or

(iii) A supplier of materials to the manufacturer;

(4) Not be dependent on Coast Guard acceptance under this subchapter to remain in business; and

(5) Not advertise or promote the manufacturer's equipment or material that the laboratory inspects and tests under this subchapter.

§ 159.010-5 Independent laboratory: Application for acceptance.

(a) Each application for acceptance of a laboratory must contain the following:

(1) The name and address of the laboratory, its subsidiaries, and its divisions.

(2) The name, title, address, and principal business activity of each of the laboratory's officers and directors, and the name, address, and principal business activity of each person, company, or corporation that owns at least 3-percent interest in the laboratory or in a company or corporation that controls the laboratory.

(3) A list of the equipment or material that the laboratory would inspect or test, or both, under this subchapter.

(4) A description of the laboratory's experience and its qualifications for conducting the inspections and tests required in the applicable subpart.

(5) A description of the apparatus and facilities available to the laboratory for conducting those inspections and tests.

(6) The qualifications of personnel who are to perform, supervise, or witness those inspections and tests.

(7) A description of the laboratory's instrument calibration program.

(8) A statement, signed by the chief officer of the laboratory or the chief officer's representative, that an official representative of the Coast Guard is allowed access to the facility to verify the information submitted in the application, or to witness tests.

§ 159.010-7 Independent laboratory: Standards for listing.

(a) To be listed as an independent laboratory under an applicable subpart, a laboratory must—

(1) Meet § 159.010-3;

(2) Have a test plan that is accepted by the Commandant under § 159.010-11(a); and

(3) Agree to perform or supervise approval or production inspections or tests under that subpart upon request from a manufacturer, however a laboratory may limit the area it serves.

§ 159.010-9 Independent laboratory: Application for listing.

(a) A laboratory that wants to be listed in one or more applicable subparts must submit to the Commandant an application that contains the information required by § 159.010-5, and that includes—

(1) The subparts under which it wants to be listed;

(2) Its test plans; and

(3) A statement of any limitations on the availability of the laboratory's service.

§ 159.010-11 Independent laboratory: Listing in subpart.

(a) From the application, the Commandant determines whether or not the laboratory meets § 159.010-7. If it meets these standards, the laboratory is added to the list in the applicable subpart. If it does not meet these standards, the Commandant informs the laboratory of the reasons why it is not added to the list.

§ 159.010–15 Contracting inspections and tests or transferrals to another laboratory or person.

(a) No independent laboratory may contract or transfer to another person or laboratory the performance or supervision of inspections or tests, or both, required under an applicable subpart for which it is accepted or listed unless—

(1) A request in writing regarding the contract or transfer is submitted to the Commandant before the contract is executed or the transfer is completed; and

(2) The Commandant notifies the laboratory in writing that the contract or the transfer is allowed.

§ 159.010–17 Application and test plans: Changes.

(a) If any of the information submitted under § 159.010-5(a) or § 159.010-9(a) changes, a notification in writing of each change must be submitted to the Commandant within 30 days after the change has occurred.

(b) If an independent laboratory wants to change its test plan, the proposed changes must be submitted to the Commandant. The Commandant notifies the laboratory if the changed test plan is accepted. If the changed test plan is not accepted, the Commandant informs the laboratory of the reasons why the changed test plan is not accepted.

§ 159.010–19 Termination of acceptance or listing of an independent laboratory.

(a) The acceptance or listing of a laboratory terminates if the laboratory—

(1) Requests termination; or

(2) Is no longer in business.

(b) The acceptance of a laboratory may be terminated by the Commandant if the laboratory—

(1) Fails to perform or supervise an inspection or test, or both, as required in an applicable subpart;

(2) Changes its test plan without Coast Guard acceptance;

(3) Attests to the lack of errors, omissions, or false statement of an approval test report that contains errors, omissions, or false statements;

(4) Does not meet § 159.010-3(a);

(5) Does not comply with § 159.010-17(a); or

(6) Unless allowed by the Commandant, contracts or transfers the performance or supervision of required inspections or tests, or both, to another laboratory or person.

(c) A laboratory is removed from the list published in an applicable subpart if the laboratory—

(1) Is no longer accepted by the Commandant; or

(2) Unreasonably refuses a request from a manufacturer to perform or supervise an approval or production inspection or test.

§ 159.010–21 Termination of acceptance or listing: Procedure.

(a) Whenever evidence is received that there exists a basis for termination of acceptance or listing of an independent laboratory under § 159.010-19 (b) or (c), the Commandant notifies the laboratory of the specific reasons for considering termination. If the deficiency could materially affect the validity of the approval issued under an applicable subpart, the Commandant may immediately suspend the acceptance of the laboratory and may direct the holder of the certificate of approval to cease claiming that the items tested or inspected by the laboratory are Coast Guard approved, pending a final decision in the matter. The Commandant may direct an investigation into the matter.

(b) Within 30 days after receipt of notice of the basis for considering termination, the laboratory may provide the Commandant evidence or arguments why acceptance or listing should continue. After consideration of all available material on the matter, the Commandant informs the laboratory, in writing, of this decision. Any person holding a certificate of approval affected by the decision is also notified of the decision.

PART 160—LIFESAVING EQUIPMENT

Subpart 160.001—Life Preservers, General

Sec.
160.001-1 Incorporation by reference.
160.001-2 General characteristics of life preservers.
160.001-3 General provisions for approval of life preservers.

Subpart 160.002—Life Preservers, Kapok, Adult and Child (Jacket Type), Models 3 and 5

160.002-1 Incorporation by reference.
160.002-2 Size and models.
160.002-3 Materials.
160.002-4 Construction.
160.002-5 Sampling, tests, and inspections.
160.002-6 Marking.
160.002-7 Procedure for approval.

Subpart 160.005—Life Preservers, Fibrous Glass, Adult and Child (Jacket Type), Models 52 and 56

160.005-1 Incorporation by reference.
160.005-2 Size and model.
160.005-3 Materials.
160.005-4 Construction.
160.005-5 Sampling, tests, and inspections.
160.005-6 Marking.
160.005-7 Procedure for approval.

Subpart 160.006—Life Preservers; Repairing and Cleaning

160.006-1 Applicable specifications.
160.006-2 Repairing.
160.006-4 Cleaning life preserver envelopes or covers.
160.006-5 Cleaning life preservers (where buoyancy fillers are not removed from envelope covers during cleaning process).

Subpart 160.009—Specification for a Buoy, Life Ring, Cork or Balsa Wood for Merchant Vessels and Boats

160.009-1 Incorporation by reference.
160.009-2 Type and size.
160.009-3 Materials.
160.009-4 Construction, workmanship, and performance standards.
160.009-5 Inspections and tests.
160.009-6 Marking.
160.009-7 Procedure for approval.

Subpart 160.010—Buoyant Apparatus for Merchant Vessels

160.010-1 Applicable specifications.
160.010-2 Types.
160.010-3 General requirements for buoyant apparatus.

Sec.
160.010-4 Buoyant apparatus using balsa wood for buoyancy.
160.010-5 Buoyant apparatus using air compartments for buoyancy.
160.010-6 Capacity of buoyant apparatus.
160.010-7 Methods of sampling, inspections and tests.
160.010-8 Nameplate and marking.
160.010-9 Procedure for approval.

Subpart 160.011—Gas Masks, Self-Contained Breathing Apparatus, and Supplied-Air Respirators, for Merchant Vessels

160.011-1 Applicable schedules.
160.011-2 Types.
160.011-3 Requirements.
160.011-4 Inspections and tests.
160.011-5 Marking.
160.011-6 Procedure for approval.

Subpart 160.012—[Reserved]

Subpart 160.013—Hatchets (Lifeboat and Liferaft) for Merchant Vessels

160.013-1 Applicable specification and plan.
160.013-2 Type and size.
160.013-3 Materials, workmanship, and construction details.
160.013-4 Inspections and tests.
160.013-5 Marking.
160.013-6 Procedure for approval.

Subpart 160.015—Lifeboat Winches for Merchant Vessels

160.015-1 Applicable regulations.
160.015-2 General requirements for lifeboat winches.
160.015-3 Construction of lifeboat winches.
160.015-4 Capacity of lifeboat winches.
160.015-5 Inspection and testing of lifeboat winches.
160.015-6 Procedure for approval of lifeboat winches.

Subpart 160.016—Lamps, Safety, Flame, for Merchant Vessels

160.016-1 Applicable specification.
160.016-2 Requirements.
160.016-3 Inspections and tests.
160.016-4 Marking.
160.016-5 Procedure for approval.

Subpart 160.017—Ladders, Embarkation-Debarkation (Flexible), for Merchant Vessels

160.017-1 Applicable specifications.
160.017-2 Types.
160.017-3 Materials for Type I ladders.
160.017-4 Materials for Type II ladders.
160.017-5 Construction of Type I ladders.

Sec.
160.017-6 Construction of Type II ladders.
160.017-7 Performance and workmanship requirements.
160.017-8 Inspections and tests.
160.017-9 Marking.
160.017-10 Procedure for approval.

Subpart 160.018—Life Rafts for Merchant Vessels

160.018-1 Applicable specifications.
160.018-2 Types.
160.018-3 Construction; general.
160.018-4 Construction; Type A; cockpit type.
160.018-5 Construction; Type B; catamaran type.
160.018-6 Capacity.
160.018-7 Inspection and testing.
160.018-8 Marking.
160.018-9 Procedure for approval.

Subpart 160.021—Hand Red Flare Distress Signals

160.021-1 Incorporations by reference.
160.021-2 Type.
160.021-3 Materials, workmanship, construction and performance requirements.
160.021-4 Approval and production tests.
160.021-5 Labeling and marking.
160.021-6 Container.
160.021-7 Procedure for approval.
160.021-9 Recognized independent laboratories.

Subpart 160.022—Floating Orange Smoke Distress Signals (5 Minutes)

160.022-1 Incorporations by reference.
160.022-2 Type.
160.022-3 Materials, workmanship, construction, and performance requirements.
160.022-4 Approval and production tests.
160.022-5 Marking.
160.022-7 Procedure for approval.
160.022-9 Recognized independent laboratories.

Subpart 160.023—Hand Combination Flare and Smoke Distress Signals

160.023-1 Incorporations by reference.
160.023-2 Type.
160.023-3 Materials, workmanship, construction and performance requirements.
160.023-4 Approval and production tests.
160.023-5 Labeling and marking.
160.023-6 Container.
160.023-7 Procedure for approval.
160.023-9 Recognized independent laboratories.

Subpart 160.024—Pistol-Projected Parachute Red Flare Distress Signals

Sec.
160.024-1 Incorporations by reference.
160.024-2 Type.
160.024-3 Materials, workmanship, construction, and performance requirements.
160.024-4 Approval and production tests.
160.024-5 Marking.
160.024-6 Container.
160.024-7 Procedure for approval.
160.024-9 Recognized independent laboratories.

Subpart 160.026—Water, Emergency Drinking (in Hermetically Sealed Containers), for Merchant Vessels

160.026-1 Applicable specifications and standards.
160.026-2 Type.
160.026-3 Container.
160.026-4 Water.
160.026-5 Marking.
160.026-6 Sampling, inspection, and tests of production lots.
160.026-7 Procedure for approval.

Subpart 160.027—Lifefloats for Merchant Vessels

160.027-1 Applicable specifications and plans.
160.027-2 Type.
160.027-3 General requirements for lifefloats.
160.027-4 Balsa wood body lifefloats.
160.027-5 Air compartment type lifefloats.
160.027-6 Capacity of lifefloats.
160.027-7 Methods of sampling, inspection and tests.
160.027-8 Name plate and marking.
160.027-9 Procedure for approval.

Subpart 160.028—Signal Pistols for Red Flare Distress Signals

160.028-2 Type.
160.028-3 Materials, workmanship, construction, and performance requirements.
160.028-4 Approval and production tests.
160.028-5 Marking.
160.028-6 Container.
160.028-7 Procedure for approval.
160.028-9 Recognized independent laboratories.

Subpart 160.031—Line-Throwing Appliance, Shoulder Gun Type (and Equipment)

160.031-1 Incorporation by reference.
160.031-2 Type and size.

Sec.
160.031-3 Materials, construction, workmanship, and performance requirements.
160.031-4 Equipment for shoulder gun type line-throwing appliance.
160.031-5 Approval and production tests.
160.031-6 Marking.
160.031-7 Procedure for approval.
160.031-9 Recognized independent laboratories.

Subpart 160.032—Davits for Merchant Vessel.

160.032-1 Applicable specifications.
160.032-2 General requirements for davits.
160.032-3 Construction of davits.
160.032-4 Capacity of davits.
160.032-5 Inspection and testing of davits.
160.032-6 Procedure for approval of davits.

Subpart 160.033—Mechanical Disengaging Apparatus, Lifeboat, for Merchant Vessels

160.033-1 Applicable specifications.
160.033-2 General requirements for mechanical disengaging apparatus.
160.033-3 Construction of mechanical disengaging apparatus.
160.033-4 Inspection and testing of mechanical disengaging apparatus.
160.033-5 Procedure for approval of mechanical disengaging apparatus.

Subpart 160.034—Hand Propelling Gear, Lifeboats, for Merchant Vessels

160.034-1 Applicable specifications.
160.034-2 General requirements for hand propelling gear.
160.034-3 Construction of hand propelling gear.
160.034-4 Inspection and testing of hand propelling gear.
160.034-5 Procedure for approval of hand propelling gear.

Subpart 160.035—Lifeboats for Merchant Vessels

160.035-1 Applicable specifications.
160.035-2 General requirements for lifeboats.
160.035-3 Construction of steel oar-propelled lifeboats.
160.035-4 Construction of steel handpropelled lifeboats.
160.035-5 Construction of steel motorpropelled lifeboats with and without radio cabin.
160.035-6 Construction of aluminum oar-, hand-, and motor-propelled lifeboats.
160.035-7 Construction of wood oar-, hand-, and motor-propelled lifeboats.

Sec.
160.035-8 Construction of fibrous glass reinforced plastic (F.R.P.) oar-, hand-, and motor-propelled lifeboats.
160.035-9 Cubic capacity of lifeboats.
160.035-10 Number of persons allowed in lifeboats.
160.035-11 Inspection and testing of lifeboats.
160.035-12 Additional preapproval tests required for F.R.P. lifeboats.
160.035-13 Testing and inspection after approval.
160.035-14 Procedure for approval of lifeboats.

Subpart 160.036—Hand-Held Rocket-Propelled Parachute Red Flare Distress Signals

160.036-1 Incorporation by reference.
160.036-2 Type.
160.036-3 Materials, workmanship, construction and performance requirements.
160.036-4 Approval and production tests.
160.036-5 Marking.
160.036-6 Container.
160.036-7 Procedure for approval.
160.036-9 Recognized independent laboratories.

Subpart 160.037—Hand Orange Smoke Distress Signals

160.037-1 Incorporations by reference.
160.037-2 Type.
160.037-3 Materials, workmanship, construction, and performance requirements.
160.037-4 Approval and production tests.
160.037-5 Labeling and marking.
160.037-6 Container.
160.037-7 Procedure for approval.
160.037-9 Recognized independent laboratories.

Subpart 160.038—Magazine Chests, Portable, for Merchant Vessels

160.038-1 Applicable specifications.
160.038-2 Type.
160.038-3 Materials, workmanship, and construction.
160.038-4 Inspections and tests.
160.038-5 Marking.
160.038-6 Procedure for approval.

Subpart 160.039—[Reserved]

Subpart 160.040—Line-Throwing Appliance, Impulse-Projected Rocket Type (and Equipment)

160.040-1 Incorporations by reference.
160.040-2 Type and size.

Sec.
160.040-3 Materials, construction, workmanship, and performance requirements.
160.040-4 Equipment for impulse projected rocket type line-throwing appliance.
160.040-5 Approval and production tests.
160.040-6 Marking and labeling.
160.040-7 Procedure for approval.
160.040-9 Recognized independent laboratories.

Subpart 160.041—Kits, First-Aid, for Merchant Vessels

160.041-1 Applicable specification and publication.
160.041-2 Type and size.
160.041-3 Construction and workmanship.
160.041-4 Contents.
160.041-5 Inspections and tests.
160.041-6 Marking.
160.041-7 Procedure for approval.

Subpart 160.042—Skids, Liferaft, for Merchant Vessels

160.042-1 Applicable specification.
160.042-2 General requirements.
160.042-3 Construction.
160.042-4 Inspection.
160.042-5 Procedure for approval.

Subpart 160.043—Jackknife (With Can Opener) for Merchant Vessels

160.043-1 Applicable specification and plan.
160.043-2 Type.
160.043-3 Materials.
160.043-4 Construction and workmanship.
160.043-5 Inspections and tests.
160.043-6 Marking and packing.
160.043-7 Procedure for approval.

Subpart 160.044—Pumps, Bilge, Lifeboat, for Merchant Vessels

160.044-1 Applicable specifications.
160.044-2 Types and sizes.
160.044-3 General requirements.
160.044-4 Inspection and tests.
160.044-5 Marking.
160.044-6 Procedure for approval.

Subpart 160.047—Specifications for a Buoyant Vest, Kapok, or Fibrous Glass, Adult and Child

160.047-1 Incorporation by reference.
160.047-2 Model.
160.047-3 Materials.
160.047-3a Materials—Dee ring and snap hook assemblies and other instruments of closure for buoyant vests.
160.047-4 Construction.
Sec.
160.047-5 Inspections and tests.
160.047-6 Marking.
160.047-6a Recognized laboratory.
160.047-6b Designated recognized laboratory.
160.047-6c Compliance label.
160.047-7 Procedure for listing and labeling.
160.047-9 Termination of listing and labeling.
160.047-10 Penalties.

Subpart 160.048—Specification for a Buoyant Cushion, Fibrous Glass

160.048-1 Incorporation by reference.
160.048-2 Types and sizes.
160.048-3 Materials.
160.048-4 Construction and workmanship.
160.048-5 Inspections and tests.
160.048-6 Marking.
160.048-7 Procedure for approval.
160.048-7a Designated recognized laboratory.
160.048-8 Procedure for listing and labeling
160.048-9 Termination of listing and labeling.
160.048-10 Penalties.

Subpart 160.049—Specification for a Buoyant Cushion Plastic Foam

160.049-1 Incorporation by reference.
160.049-2 Types and sizes.
160.049-3 Materials.
160.049-4 Construction and workmanship.
160.049-5 Inspections and tests.
160.049-6 Marking.
160.049-7 Recognized laboratory.
160.049-7a Designated recognized laboratory.
160.049-8 Procedure for listing and labeling.
160.049-9 Termination of listing and labeling.
160.049-10 Penalties.

Subpart 160.050—Specification for a Buoy, Life Ring, Unicellular Plastic

160.050-1 Incorporation by reference.
160.050-2 Types and sizes.
160.050-3 Materials.
160.050-4 Construction and workmanship.
160.050-5 Sampling, tests, and inspection.
160.050-6 Marking.
160.050-7 Procedure for approval.

Subpart 160.051—Inflatable Liferafts

160.051-1 Applicable specifications.
160.051-2 Alternate construction.
160.051-3 Type and sizes.
160.051-4 Design.

Sec.
160.051-5 Inspections and tests.
160.051-6 Servicing.
160.051-7 Equipment.
160.051-8 Nameplate and marking.
160.051-9 Procedure for approval.

Subpart 160.052—Specification for a Buoyant Vest, Unicellular Plastic Foam, Adult and Child

160.052-1 Incorporation by reference.
160.052-2 Size and model.
160.052-3 Materials—Standard vests.
160.052-3a Materials—Dee ring and snap hook assemblies and other instruments of closure for buoyant vests.
160.052-4 Materials—nonstandard vests.
160.052-5 Construction—standard vests.
160.052-6 Construction—nonstandard vests.
160.052-7 Inspection and tests—standard and nonstandard vests.
160.052-8 Marking.
160.052-8a Recognized laboratory.
160.052-8b Designated recognized laboratory.
160.052-8c Compliance label.
160.052-9 Procedure for listing and labeling.
160.052-11 Termination of listing and labeling.
160.052-12 Penalties.

Subpart 160.053—Work Vests, Unicellular Plastic Foam

160.053-1 Applicable specifications.
160.053-2 Type.
160.053-3 Materials, construction and workmanship.
160.053-4 Inspections and tests.
160.053-5 Marking.
160.053-6 Procedure for approval.

Subpart 160.054—Kits, First-Aid, for Inflatable Liferafts

160.054-1 Applicable specification.
160.054-2 Type and size.
160.054-3 Construction.
160.054-4 Contents.
160.054-5 Inspections and tests.
160.054-6 Marking.
160.054-7 Procedure for approval.

Subpart 160.055—Life Preservers, Unicellular Plastic Foam, Adult and Child, for Merchant Vessels

160.055-1 Incorporation by reference.
160.055-2 Type and model.
160.055-3 Materials—standard life preservers.
160.055-4 Materials—nonstandard life preservers.

Sec.
160.055-5 Construction—Standard life preservers.
160.055-6 Construction—nonstandard, life preservers.
160.055-7 Sampling, test, and inspections—standard and nonstandard life preservers.
160.055-8 Marking.
160.055-9 Procedure for approval—standard and nonstandard life preservers.

Subpart 160.056—Rescue Boat

160.056-1 General requirements.
160.056-2 Construction.
160.056-3 Fittings and equipment.
160.056-4 Approval tests of prototype rescue boat.
160.056-5 Inspections.
160.056-6 Name plate.
160.056-7 Procedure for approval.

Subpart 160.057—Floating Orange Smoke Distress Signals (15 Minutes)

160.057-1 Incorporations by reference.
160.057-2 Type.
160.057-3 Materials, workmanship, construction, and performance requirements.
160.057-4 Approval and production tests.
160.057-5 Marking.
160.057-7 Procedure for approval.
160.057-9 Recognized independent laboratories.

Subpart 160.058—Desalter Kits, Sea Water, for Merchant Vessels

160.058-1 Applicable specification.
160.058-2 Type.
160.058-3 Materials, workmanship construction and performance requirements.
160.058-4 Inspections.
160.058-5 Labeling and marking.
160.058-6 Procedure for approval.

Subpart 160.060—Specification for a Buoyant Vest, Unicellular Polyethylene Foam, Adult and Child

160.060-1 Incorporation by reference.
160.060-2 Type and model.
160.060-3 Materials—standard vests.
160.060-3a Materials—Dee ring and snap hook assemblies and other instruments of closure for buoyant vests.
160.060-4 Materials—nonstandard vests.
160.060-5 Construction—standard vests.
160.060-6 Construction—nonstandard vests.
160.060-7 Inspections and tests—standard and nonstandard vests.
160.060-8 Marking.

Sec.
160.060-8a Recognized laboratory.
160.060-8b Designated recognized laboratory.
160.060-8c Compliance label.
160.060-9 Procedure for listing and labeling.
160.060-11 Termination of listing and labeling.
160.060-12 Penalties.

Subpart 160.061—Fishing Tackle Kits, Emergency, for Merchant Vessels

160.061-1 Applicable specifications.
160.061-2 Requirements.
160.061-3 Design and construction.
160.061-4 Kit assembly.
160.061-5 Marking.
160.061-6 Inspection and test.
160.061-7 Procedure for approval.

Subpart 160.062—Releases, Lifesaving Equipment, Hydraulic and Manual

160.062-1 Applicable specifications, and referenced material.
160.062-2 Types.
160.062-3 Materials, construction, workmanship, and performance requirements.
160.062-4 Inspections and tests.
160.062-5 Markings.
160.062-6 Procedure for approval.
160.062-7 Procedures for acceptance of repair facility.
160.062-8 Procedures for acceptance of testing facility.

Subpart 160.064—Marine Buoyant Devices

160.064-1 Applicable specifications.
160.064-2 Types and models.
160.064-3 Requirements.
160.064-4 Marking.
160.064-5 Recognized laboratory.
160.064-5a Designated recognized laboratory.
160.064-5b Compliance label.
160.064-6 Examinations, tests and inspections.
160.064-7 Procedure for listing and labeling.
160.064-8 Termination of listing and labeling.
160.064-9 Penalties.

Subpart 160.066—Distress Signal for Boats, Red Aerial Pyrotechnic Flare

160.066-1 Type.
160.066-5 Design, construction and manufacturing requirements.
160.066-7 Performance requirements.
160.066-9 Labeling.
160.066-10 Expiration date.
Sec.
160.066-11 Approval procedures.
160.066-12 Operational tests.
160.066-13 Technical tests.
160.066-15 Production testing.
160.066-18 Recognized independent laboratories.

Subpart 160.071—Exposure Suits

160.071-1 Scope.
160.071-3 Applicable regulations and standards incorporated by reference.
160.071-5 Independent laboratory.
160.071-7 Approval procedure.
160.071-9 Construction.
160.071-11 Performance.
160.071-13 Storage case.
160.071-15 Instructions.
160.071-17 Approval testing for adult size exposure suit.
160.071-19 Approval testing for child size exposure suit.
160.071-23 Marking.
160.071-25 Production testing.

Subpart 160.072—Distress Signals for Boats, Orange Flag

160.072-1 Applicability.
160.072-3 General performance requirements.
160.072-5 Accelerated weathering test.
160.072-7 Manufacturer certification and labeling.
160.072-9 Manufacturer notification.

Subpart 160.001—Life Preservers, General

AUTHORITY: R.S. 4417a, as amended, 4426, as amended, 4488, as amended, 4491, as amended, 4492, as amended, sec. 10, 35 Stat. 428, as amended secs. 1, 2, 49 Stat. 1544, 1545, as amended secs. 6, 17, 3, 54 Stat. 164, as amended, 166, as amended, 347, as amended, sec. 3, 70 Stat. 152, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 404, 481 489, 490, 395, 367, 526e, 526p, 1333, 390b, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521, 167-14, Nov. 26, 1954, 19 FR 8026; 167-20 June 18, 1956, 21 FR 4894; CGFR 56-28 July 24, 1956, 21 FR 5659; 167-38, Oct. 26 1959, 24 FR 8857.

SOURCE: 11 FR 847, Jan. 23, 1946, unless otherwise noted.

§ 160.001-1 Incorporation by reference.

(a) This subpart makes reference to the following documents:

(1) Federal Specifications:

V-T-276H-Thread, Cotton.
V-T-285D-Thread, Polyester.
V-T-295D-Thread, Nylon.

(2) Military Specification:

MIL-T-3530E-Thread and Twine; mildew resistant or water repellent treated.

(b) The Federal Specifications to which this subpart refers may be purchased from the Business Service Center, General Services Administration, Washington, D.C. 20407, or from any other regional General Services Administration Business Service Center.

(c) Military Specification MIL-T-3530E may be obtained from the Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, PA 19120.

(d) If an incorporated reference is not available from these sources, it may be obtained from the Commandant (G-MMT-3/83), U.S. Coast Guard, Washington, D.C. 20590.

[CGD 78-012, 43 FR 27152, June 22, 1978]

§ 160.001-2 General characteristics of life preservers.

(a) A life preserver shall be of such construction, material and workmanship that it can perform its intended function in all weathers and at all temperatures which may be expected in the normal usage of such life preserver. No more metal or other such nonbuoyant materials shall be used than is reasonably necessary in the construction of a life preserver.

(b) A life preserver shall be capable of supporting in fresh water for 48 hours a minimum of 16.5 pounds.

(c) Life preservers the buoyancy of which depends upon air compartments, inflation, or loose granulated material are prohibited.

(d) A life preserver shall be simple in design, reversible, and capable of being quickly adjusted for secure fit to the body of a wearer of the size for which it is intended.

(e) A life preserver shall support the wearer in the water in an upright or slightly backward position, and shall provide support to the head so that the face of an unconscious or exhausted person is held above the water.

(f) A life preserver shall be capable of turning the wearer, upon entering the water, to a safe flotation position as described in paragraph (e) of this section.

(g) A life preserver shall not be appreciably deteriorated or rendered unable to perform its intended function by common oils or oil products.

(h) A life preserver shall be of a highly visible color, such as Indian Orange, International Orange, or Scarlet Munsell Red.

(i) A life preserver shall be of such construction, materials, and workmanship as to be at least equivalent to a standard type life preserver described in detail by other subparts in this part.

(j) Each thread in a life preserver under Subparts 160.002, 160.005, and 160.055 of this chapter must meet the requirements of a Federal Specification in Table 160.001-2(j). Each cotton thread must be treated with Type 1, Class I or Class II, mildew inhibitor as specified in MIL-T-3530. Only one kind of thread may be used in each seam.

TABLE 160.001-2(j)—THREAD

Federal specification	Material	Type	Class	Ticket No. or letter size
V-T-276H	Cotton	IB	—	16
V-T-285D	Polyester	I or II	1	E
V-T-295D	Nylon	I or II	A	E

[CGFR 66-33, 31 FR 15297, Dec. 6, 1966, as amended by CGD 78-012, 43 FR 27152, June 22, 1978]

§ 160.001-3 General provisions for approval of life preservers.

(a) Designs of life preservers are approved only by the Commandant, U.S. Coast Guard, Washington, D.C. 20590.

(b) Standard type life preservers covered by detailed specifications in this part shall be submitted as provided by the applicable subpart.

(c) Life preservers in any degree different from the standards contained in this part shall be submitted for approval through the Coast Guard District Commander of the district in which the factory is located, and shall include duplicate specimen life preservers, together with plans, material lists, and construction specifications in quadruplicate.

[11 FR 847, Jan. 23, 1946; 11 FR 10089, Sept. 11, 1946, as amended by CGFR 65-16, 30 FR 10897, Aug. 21, 1965; CGD 78-012, 43 FR 27154, June 22, 1978]

Subpart 160.002—Life Preservers, Kapok, Adult and Child (Jacket Type), Models 3 and 5

AUTHORITY: R.S. 4417a, as amended, 4426, as amended, 4488, as amended, 4491, as amended, 4492, as amended, sec. 10, 35 Stat. 428, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, secs. 6, 17, 3, 54 Stat. 164, as amended, 166, as amended, 347, as amended, sec. 3, 70 Stat. 152, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 404, 481, 489, 490, 395, 367, 526e, 526p, 1333, 390b, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-20, June 18, 1956, 21 FR 4894; CGFR 56-28, July 24, 1956, 21 FR 5659; 167-38, Oct. 26, 1959, 24 FR 8857.

§ 160.002-1 Incorporation by reference.

(a) *Specifications and standards.* This subpart makes reference to the following documents:

(1) Military Specifications:

MIL-W-530—Webbing, Textile, Cotton. General Purpose, Natural or in Colors.

(2) Federal Specification:

L-P-375—Plastic Film, Flexible, Vinyl Chloride.

(3) Federal Standards:

No. 191—Textile Test Methods.
No. 751A—Stitches, Seams, and Stitchings.

(4) Coast Guard specifications:

164.003—Kapok, Processed.

(b) *Plans.* The following plans, of the issue in effect on the date life preservers are manufactured, form a part of this specification:

Dwg. No. F-49-6-1:
(Sheet 1) Cutting Pattern and General Arrangement (adult).
(Sheet 1A) Alternate stitching of tapes and webbing (adult and child).
(Sheet 2) Pad Detail (adult).
Dwg. No. F-49-6-5:
(Sheet 1) Cutting Pattern and General Arrangement (child).
(Sheet 2) Pad Detail (child).

(c) *Copies on file.* Copies of the specifications and plans referred to in this section shall be kept on file by the manufacturer, together with the certificate of approval. They shall be kept for a period consisting of the duration of approval and 6 months after termination of approval. The Coast Guard specifications and plans may be obtained upon request from the Commandant, U.S. Coast Guard, Washington, D.C., 20590. The Federal specifications and standards may be purchased from the Business Service Center, General Services Administration, Washington, D.C., 20407. The Military specifications may be obtained from the Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, Pa., 19120.

(d) [Reserved]

[CGFR 53-25, 18 FR 7855, Dec. 5, 1953, as amended by CGFR 65-16, 30 FR 10897, Aug. 21, 1965; CGD 78-012, 43 FR 27153, 27154, June 22, 1978]

§ 160.002-2 Size and models.

Each life preserver specified in this subpart is to be a:

(a) Model 3, adult, 24 ounces kapok; or

(b) Model 5, child, 16 ounces kapok.

[CGD 72-163R, 38 FR 8118, Mar. 28, 1973]

§ 160.002-3 Materials.

(a) *Kapok.* The kapok shall be all new material complying with Subpart 164.003 of this subchapter and shall be properly processed.

(b) *Envelope.* The life preserver envelope, or cover, shall be made of cotton drill. The color shall be Indian Orange, Cable No. 70072, Standard Color Card of America, issued by the Textile Color Association of the United States, Inc., 200 Madison Avenue, New York, N.Y., or Scarlet Munsell 7.5 Red 6/10. The drill shall be evenly dyed, and the fastness of the color to laundering, water, crocking, and light shall be rated "good" when tested in accordance with Federal Test Method Standard No. 191, Methods 5610, 5630, 5650, and 5660. After dyeing, the drill shall be treated with a mildew-inhibitor of the type specified in paragraph (j) of this section. The finished goods shall contain not more than 2 percent residual sizing or other non-fibrous material, shall weigh not less than 6.5 ounces per square yard, shall have a thread count of not less than 72 in the warp and 54 in the filling, and shall have a breaking strength (grab method) of not less than 105 pounds in the warp and 70 pounds in the filling. If it is proposed to treat the fabric with a fire-retardant substance, full details shall be submitted to the Commandant for determination as to what samples will be needed for testing.

(c) *Tunnel strip.* The tunnel strip shall be made of cotton drill conforming to the requirements for the envelope cover.

(d) *Pad covering.* The covering for the kapok pad inserts shall be flexible vinyl film not less than 0.006 inch in thickness meeting the requirements of specification L-P-375 for Type I film Type II, Class 1 film not less than 0.008 inch in thickness will also be acceptable.

(e) *Tie tapes and drawstrings.* The tie tapes at the neck and the lower drawstrings shall be made of 1¼-inch cotton tape weighing not less than 0.3 ounce per linear yard, and having a minimum breaking strength of 200 pounds. The tie tapes and drawstrings shall be treated with a mildew-inhibitor of the type specified in paragraph (j) of this section.

(f) *Body strap.* The body strap shall be made of one-inch cotton webbing having a minimum breaking strength of 400 pounds. One-inch cotton webbing meeting the requirements of specification MIL-W-530 for Type IIb webbing is acceptable. The complete body strap assembly shall have a minimum breaking strength of 360 pounds. The body strap shall be treated with a mildew-inhibitor of the type specified in paragraph (j) of this section.

(g) *Dee rings and snap hook.* The dee rings and snap hook shall be of brass, bronze, or stainless steel, and of the approximate size indicated by Dwg. F-49-6-1, Sheet 1. The snap hook spring shall be phosphor bronze or other suitable corrosion-resistant material. Dee ring ends shall be welded to form a continuous ring. The webbing opening of the snap hook shall be a continuous ring.

(h) *Reinforcing tape.* The reinforcing tape shall be made of ¾-inch cotton tape weighing not less than 0.18 ounce per linear yard and having a minimum breaking strength of 120 pounds, and shall be treated with a mildew-inhibitor of the type specified in paragraph (j) of this section.

(i) *Thread.* Each thread must meet § 160.001-2(j). Only one kind of thread may be used in each seam.

(j) *Mildew-inhibitor.* The mildew-inhibitor shall be dihydroxydichloro- diphenylmethane, known commercially as Compound G-4, applied by the aqueous method. The amount of inhibitor deposited shall be not more than 1.50 percent and not less than 1.00 percent of the dry weight of the finished goods.

[CGFR 58-23, 23 FR 4627, June 25, 1958, as amended by CGFR 65-16, 30 FR 10897, Aug. 21, 1965; CGD 78-012, 43 FR 27153, 27154; June 22, 1978]

§ 160.002-4 Construction.

(a) *General.* This specification covers life preservers which essentially consist of a vest-cut envelope containing pockets in which are enclosed pads of buoyant material, the life preserver being fitted with tapes and webbing to provide complete reversibility, proper adjustment for close fit to the bodies of various size wearers, and proper flotation characteristics to hold the wearer in an upright backward position with head and face out of water.

(b) *Envelope.* The envelope shall be of not more than two pieces, one piece for either side, cut to the pattern shown on Dwg. No. F-49-6-1, Sheet 1, for adult size, and Dwg. F-49-6-5, Sheet 1, for child size, joined by seams and stitching as shown on the drawing. A drawstring tunnel shall be formed by stitching a strip of the tunnel strip material as shown on the drawing. The ends of the tunnel strip shall be tucked under the reinforcing tape stitched around the end openings so there is no direct access to the pads from the outside. Three pockets shall be formed for insertion of the kapok pads. The two front pads shall be removable from the envelope when portions of the lower longitudinal seam are opened, and the back pad shall be removable when a portion of one armhole seam is opened.

(c) *Pad inserts*—(1) *Forming, sealing, and distribution of kapok.* The buoyant pad inserts shall be formed from two pieces of film cut to the patterns shown by Dwg. No. F-49-6-1, Sheet 2, for adult size, and Dwg. No. F-49-6-5, Sheet 2, for child size, which shall be heat-sealed tight. The heat-sealed pad seams shall show an adhesion of not less than 8 pounds when one inch strips cut across and perpendicular to the seams are pulled apart at a rate of separation of the clamping jaws of the test machine of 12 inches per minute. The pad inserts shall be filled with kapok distributed as follows:

TABLE 160.002-4 (c)(1)—DISTRIBUTION OF KAPOK IN PAD INSERTS

	Model 3 (minimum)	Model 5 (minimum)
Front pad (2):		
Lower section	5.25 oz. each	3.50 oz. each.
Upper section	3.75 oz. each	2.50 oz. each.
Back Pad	6.00 oz.	4.00 oz.
Total	24.00 oz.	16.00 oz.

(2) *Displacement of pad inserts.* The volume of the finished individual heat-sealed buoyant pad inserts shall be such as to provide buoyancy as set forth in the following table when tested in accordance with the method set forth in § 160.002-5(d), except that the period of submergence shall be only long enough to determine the displacement of the pads:

TABLE 160.002-4(c)(2)—VOLUME DISPLACEMENT OF SEALED PADS

	Model 3	Model 5
Front pads	12½ lbs. each ± ¾ lb	6½ lbs. each ± ½ lb.
Back pads	8 lbs. each ± ½ lb	4½ lbs. each ± ½ lb.

(d) *Tie tapes.* The tie tapes at the neck shall extend not less than 14 inches from the edge of the adult life preserver and not less than 12 inches from the edge of the child life preserver. They shall be stitched through both thicknesses of the envelope as shown by Dwg. No. F-49-6-1, Sheet 1, for adult size, and Dwg. No. F-49-6-5, Sheet 1, for child size, or by the alternate stitching shown on Sheet 1A. The free ends shall be doubled over and stitched in accordance with Section G-G of Sheet 1.

(e) *Drawstrings.* The drawstrings at the waist shall extend not less than 8 inches from the edge of the life preserver and shall be secured in the drawstring tunnel as shown by Dwg. No. F-49-6-1, Sheet 1, for adult size, and Dwg. No. F-49-6-5, Sheet 1, for child size, or by the alternate stitching shown on Sheet 1A. The free ends shall be doubled over and stitched in accordance with Section G-G of Sheet 1.

(f) *Body strap.* The body strap shall be fitted with a single Dee ring on one end with the arrangement of a snap hook and pre-threaded double Dee rings as shown on Dwg. No. F-49-6-1, Sheet 1, on the other. The body strap shall be stitched as shown on the drawings, and the edge of the single Dee ring shall be 20 inches from the center line for adult size and 15 inches for child size.

(g) *Reinforcing tape.* Binding tape shall be stitched approximately 15 inches for adult jackets and 12 inches for child jackets around the back of the neck, and also around the openings of the drawstring tunnel and around the bottom of the armholes, as indicated by the drawings.

(h) *Stitching.* All stitching shall be a short lock stitch conforming to Stitch Type 301 of Federal standard No. 751 and there shall be not less than 7, nor more than 9 stitches to the inch.

(i) *Workmanship.* Life preservers shall be of first-class workmanship and shall be free from any defects materially affecting their appearance or serviceability.

[CGFR 53-25, 18 FR 7856, Dec. 5, 1953, as amended by CGFR 58-23, 23 FR 4627, June

25, 1958; CGFR 65-16, 30 FR 10897, Aug. 21, 1965]

§ 160.002-5 Sampling, tests, and inspections.[1]

(a) *General.* When production is to commence on life preservers or kapok pad inserts for use in life preservers, the manufacturer shall notify the Officer in Charge, Marine Inspection, U.S. Coast Guard, of the inspection zone in which the factory is located in sufficient time for him to assign a Coast Guard marine inspector to the plant to observe production methods and to conduct any inspections or tests which may be deemed advisable. Manufacturers of approved life preservers shall maintain quality control of the materials used, manufacturing operations, and the finished product so as to meet the requirements of this specification. When a lot of life preservers is presented for Coast Guard inspection, it is expected that the manufacturer will previously have taken all ordinary precautions to assure himself that the life preservers are in full compliance with the requirements of this specification. The Coast Guard inspections and test are not intended to replace, or be a substitute for, full inspections and tests by the manufacturer to maintain the quality of his product. The Coast Guard marine inspector shall be admitted to any place in the factory where work is done on the life preservers or on component materials or parts. Samples of materials entering into construction may be taken by the inspector and tests made for compliance with the applicable requirements.

(b) *Lot size and sampling.* (1) A lot shall consist of not more than 500 life preservers. A new lot shall be started with any change or modification in materials used or manufacturing methods employed. When a lot of life preservers is ready for inspection, the manufacturer shall notify the Officer in Charge, Marine Inspection, U. S. Coast Guard, of the inspection zone in which the factory is located, who will assign a marine inspector to the plant for the purpose of making the necessary tests and inspections. From each lot of life preservers the marine inspector shall select samples in accordance with the following table to be tested for buoyancy in accordance with paragraph (d) of this section:

TABLE 160.002-5(b)(1)—SAMPLING FOR BUOYANCY TESTS

Lot size:	*Number of life preservers in sample*
100 and under	1
101 to 200	2
201 to 300	3
301 to 500	4

(2) For a lot next succeeding one from which any sample life preserver failed the buoyancy test, the sample shall consist of not less than ten specimen life preservers to be tested for buoyancy in accordance with paragraph (d) of this section.

(c) *Test facilities.* The manufacturer shall provide a suitable place and the necessary apparatus for the use of the inspector in conducting tests to determine compliance of life preservers with this specification. The apparatus shall include accurate spring scales of adequate capacity, weighted wire mesh baskets, and a test tank or tanks which can be locked or sealed in such manner as to preclude disturbance of life preservers undergoing test or change in water level.

(d) *Buoyancy test.* Remove the buoyant pad inserts from the life preserver and cut three slits in the film on both sides of both the upper and lower sections of the front pads and three slits on both sides of the back pad. The slits shall be not less than 2 inches in length and spaced not less than 2 inches apart. Securely attach the spring scale in a position directly over the test tank. Suspend the weighted wire basket from the scale in such a manner that the basket may be weighed while it is completely under water. In order to measure the actual buoyancy provided by the pads, the underwater weight of the empty basket should exceed the buoyancy of the pads; to obtain the buoyancy of the pads, proceed as follows:

---

[1] The manufacturer of a personal flotation device must meet 33 CFR 181.701 through 33 CFR 181.705 which require an instruction pamphlet for each device that is sold or offered for sale for use on recreational boats.

(1) Weigh the empty wire basket under water.

(2) Place the pads inside the basket, and submerge it so that the top of the basket is at least 2 inches below the surface of the water. Allow the pads to remain submerged for 48 hours. The tank shall be locked or sealed during this 48-hour submergence period. It is important that after the pads have once been submerged they shall remain submerged for the duration of the test, and at no time during the course of the test shall they be removed from the tank or otherwise exposed to air.

(3) After the 48-hour submergence period unlock or unseal the tank and weigh the wire basket with the pads inside while both are still under water.

(4) The buoyancy is computed as (1) minus (3).

(e) *Buoyancy required.* The buoyant pad inserts from Model 3 adult life preservers shall provide not less than 25 pounds buoyancy in fresh water, and the pads from Model 5 child life preservers shall provide not less than 16½ pounds buoyancy.

(f) *Lot inspection.* If the sample life preserver or preservers meet the buoyancy requirement, the inspector shall carefully inspect individually each of the life preservers in the lot, making such examination and tests as are necessary to satisfy himself that the life preservers have been manufactured according to this specification. Nonconforming units shall be eliminated. The manufacturer shall provide a well lighted place equipped with a suitable smooth top table for use by the inspector and shall provide labor for all handling of life preservers requisite to lot inspection.

(g) *Lot acceptance.* When the inspector has satisfied himself that the life preservers in the lot are of a type officially approved in the name of the company, and that such life preservers meet the requirements of this specification, they shall be plainly marked in waterproof ink with the words "Inspected and Passed, (Date), (Marine Inspection Office identification letters) U.S.C.G."

(h) *Lot rejection.* If any sample life preserver fails the buoyancy test, ten additional specimen life preservers shall be selected from the lot and tested for buoyancy. If all the ten additional specimen life preservers pass the buoyancy test, the lot shall be considered for lot inspection as set forth in paragraph (f) of this section. If any one of the ten additional specimen life preservers fails the buoyancy test, the lot shall be rejected. If, in the lot inspection, three or more non-conforming units are eliminated for the same kind of defect, lot inspection shall be discontinued until such time as the manufacturer has inspected the remainder of the lot and eliminated or corrected additional units having the same kind of defect. Non-conforming units which have been eliminated in the lot inspection may be re-submitted for inspection, provided that all defects have been corrected to the satisfaction of the inspector. When permitted by the Commander of the Coast Guard District, rejected lots may be re-worked by the manufacturer to correct the deficiency for which they were rejected and to eliminate all nonconforming units, following which the remainder of the lot may be re-submitted for official testing and inspection. Life preservers from rejected lots may not, unless subsequently accepted, be sold or offered for sale under representation as being in compliance with this specification or as being approved for use on merchant vessels or motorboats.

(46 U.S.C. 375, 416; 49 U.S.C. 1655(b); 49 CFR 1.4(b), and 1.46)

[CGFR 53-25, 18 FR 7857, Dec. 5, 1953, as amended by CGFR 58-23, 23 FR 4627, June 25, 1958; CGD 75-186, 41 FR 10437, Mar. 11, 1976; CGD 75-008, 43 FR 9772, Mar. 9, 1978]

§ 160.002-6 Marking.

Each life preserver must have the following clearly marked in waterproof ink on a front section:

(a) In letters three-quarters of an inch or more in height:

(1) Adult (for persons weighing over 90 pounds); or

(2) Child (for persons weighing less than 90 pounds).

(b) In letters that can be read at a distance of 2 feet:

Type I Personal Flotation Device.
Inspected and tested in accordance with U.S. Coast Guard regulations.
Kapok buoyant material provides a minimum buoyant force of (25 lb. or 16½ lb.).
Do not snag or puncture inner plastic cover.
Approved for use on all vessels by persons weighing (90 lb. or more, or less than 90 lb.).
U.S. Coast Guard Approval No. 160.002/(assigned manufacturer's No.)/(Revision No.); (Model No.).
(Name and address of manufacturer or distributor.).
(Lot No.).

[CGD 72-163R, 38 FR 8118, Mar. 28, 1973, as amended by CGD 75-008, 43 FR 9770, Mar. 9, 1978]

§ 160.002-7 Procedure for approval.

(a) *General.* Life preservers for use on merchant vessels or motorboats are approved only by the Commandant, U.S. Coast Guard, Washington, D.C., 20590. Each model life preserver is considered separately. Correspondence pertaining to the subject matter of this specification shall be addressed to the Commander of the Coast Guard District in which the factory is located. The Commander of the Coast Guard District will detail a marine inspector to the factory to observe the production facilities and manufacturing methods and to select, from not less than ten life preservers already manufactured, not less than three life preservers for test in accordance with §§ 160.002-4(c)(2) and 160.002-5(d). A copy of the marine inspector's report, together with a fourth specimen life preserver and one set of pad inserts selected from those already manufactured, will be forwarded to the Commandant for examination, and if satisfactory an official approval number will be assigned to the manufacturer for the model life preserver submitted.

[CGFR 58-23, 23 FR 4628, June 25, 1958, as amended by CGFR 65-16, 30 FR 10897, Aug. 21, 1965; CGD 78-012, 43 FR 27154, June 22, 1978]

Subpart 160.005—Life Preservers, Fibrous Glass, Adult and Child (Jacket Type), Models 52 and 56

AUTHORITY: R.S. 4417a, as amended, 4426, as amended, 4481, as amended, 4488, as amended, 4491, as amended, sec. 10, 35 Stat. 428, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, secs. 6, 17, 3, 54 Stat. 164, as amended, 166, as amended, 347, as amended, sec. 3, 70 Stat. 152, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 404, 481, 489, 490, 395, 367, 526e, 526p, 1333, 390b, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-20, June 18, 1956, 21 FR 4894; CGFR 56-28, July 24, 1956, 21 FR 5659; 167-38, Oct. 26, 1959, 24 FR 8857.

§ 160.005-1 Incorporation by reference.

(a) *Specifications and Standards.* This subpart makes reference to the following documents:

(1) Federal Specification:

L-P-375C—Plastic Film, Flexible, Vinyl Chloride.

(2) Federal Standards:

No. 191—Textile Test Methods.
No. 751A—Stitches, Seams, and Stitchings.

(3) Military Specification:

MIL-W-530F—Webbing, Textiles, Cotton, General Purpose, Natural and in colors.
MIL-R-2766B—Batt, Fibrous Glass, Lifesaving Equipment.

(b) *Plans.* The following plans, of the issue in effect on the date life preservers are manufactured, form a part of this subpart:

Dwg. No. 160.005-1:
  (Sheet 1) Cutting Pattern and General Arrangement (Adult).
  (Sheet 2) Alternate Stitching of Tapes and Webbing (Adult and Child).
  (Sheet 3) Pad Detail (Adult).
  (Sheet 4) Cutting Pattern and General Arrangement (Child).
  (Sheet 5) Pad Detail (Child).

(c) *Copies on file.* Copies of the specifications and plans referred to in this section shall be kept on file by the manufacturer, together with the certificate of approval. They shall be kept for a period consisting of the duration of approval and 6 months after termination of approval. The Coast Guard plans may be obtained upon request from the Commandant, U.S. Coast Guard, Washington, D.C., 20590.

The Federal specifications and standards may be purchased from the Business Service Center, General Services Administration, Washington, D.C. 20407. The Military specifications may be obtained from the Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, Pa. 19120.

[CGFR 53-25, 18 FR 7862, Dec. 5, 1953, as amended by CGFR 65-16, 30 FR 10897, Aug. 21, 1965; CGD 78-012, 43 FR 27153, 27154, June 22, 1978]

§ 160.005-2 Size and model.

Each life preserver specified in this subpart is a:

(a) Model 52, adult, 46 ounces fibrous glass; or

(b) Model 56, child, 30 ounces fibrous glass.

[CGD 72-163R, 38 FR 8118, Mar. 28, 1973]

§ 160.005-3 Materials.

(a) *Fibrous glass.* The fibrous glass shall be all new material complying with the requirements of Specification MIL-B-2766.

(b) *Envelope.* The life preserver envelope, or cover, shall be made of cotton drill. The color shall be Indian Orange, Cable No. 70072, Standard Color Card of America, issued by the Textile Color Association of the United States, Inc., 200 Madison Avenue, New York, N.Y., or Scarlet Munsell 7.5 Red 6/10. The drill shall be evenly dyed, and the fastness of the color to laundering, water, crocking, and light shall be rated "good" when tested in accordance with Federal Test Method Standard No. 191, Methods 5610, 5630, 5650, and 5660. After dyeing, the drill shall be treated with a mildew-inhibitor of the type specified in paragraph (j) of this section. The finished goods shall contain not more than 2 percent residual sizing or other nonfibrous material, shall weigh not less than 6.5 ounces per square yard, shall have a thread count of not less than 72 in the warp and 54 in the filling, and shall have a breaking strength (grab method) of not less than 105 pounds in the warp and 70 pounds in the filling. If it is proposed to treat the fabric with a fire-retardant substance, full details shall be submitted to the Commandant for determination as to what samples will be needed for testing.

(c) *Tunnel strip.* The tunnel strip shall be made of cotton drill conforming to the requirements for the envelope cover.

(d) *Pad covering.* The covering for the fibrous glass pad inserts shall be flexible vinyl film not less than 0.006 inch in thickness meeting the requirements of specification L-P-375 for Type I film. Type II, Class 1 film not less than 0.008 inch in thickness will also be acceptable.

(e) *Tie tapes and drawstrings.* The tie tapes at the neck and the lower drawstrings shall be made of 1 ¼-inch cotton tape weighing not less than 0.3 ounce per linear yard, and having a minimum breaking strength of 200 pounds. The tie tapes and drawstrings shall be treated with a mildew-inhibitor of the type specified in paragraph (j) of this section.

(f) *Body strap.* The body strap shall be made of one-inch cotton webbing having a minimum breaking strength of 400 pounds. One-inch cotton webbing meeting the requirements of specification MIL-W-530 for Type IIb webbing is acceptable. The complete body strap assembly shall have a minimum breaking strength of 360 pounds. The body strap shall be treated with a mildew-inhibitor of the type specified in paragraph (j) of this section.

(g) *Dee rings and snap hook.* The dee rings and snap hook shall be brass, bronze, or stainless steel, and of the approximate size indicated by Dwg. No. 160.005-1, Sheet 1. The snap hook spring shall be phosphor bronze or other suitable corrosion-resistant material. Dee ring ends shall be welded to form a continuous ring. The webbing opening of the snap hook shall be a continuous ring.

(h) *Reinforcing tape.* The reinforcing tape shall be made of ¾-inch cotton tape weighing not less than 0.18 ounce per linear yard and having a minimum breaking strength of 120 pounds, and shall be treated with a mildew-inhibitor of the type specified in paragraph (j) of this section.

(i) *Thread.* Each thread must meet § 160.001-2(j). Only one kind of thread may be used in each seam.

(j) *Mildew-inhibitor.* The mildew-inhibitor shall be dihydroxydichloro- diphenylmethane, known commercially as Compound G-4, applied by the aqueous method. The amount of inhibitor deposited shall be not more than 1.50 percent and not less than 1.00 percent of the dry weight of the finished goods.

[CGFR 58-23, 23 FR 4628, June 25, 1958, as amended by CGFR 65-16, 30 FR 10898, Aug. 21, 1965; CGD 78-012, 43 FR 27153, 27154, June 22, 1978]

§ 160.005-4 Construction.

(a) *General.* This specification covers life preservers which essentially consist of a vest-cut envelope containing pockets in which are enclosed pads of buoyant material, the life preserver being fitted with tapes and webbing to provide complete reversibility, proper adjustment for close fit to the bodies of various size wearers, and proper flotation characteristics to hold the wearer in an upright backward position with head and face out of water.

(b) *Envelope.* The envelope shall be of not more than two pieces, one piece for either side, cut to the pattern shown on Dwg. No. 160.005-1, Sheet 1, for adult size, and Sheet 4, for child size, joined by seams and stitching as shown on the drawing. A drawstring tunnel shall be formed by stitching a strip of the tunnel strip material as shown by the drawing. The ends of the tunnel strip shall be tucked under the reinforcing tape stitched around the end openings so there is no direct access to the pads from the outside. Three pockets shall be formed for insertion of the pads. The two front pads shall be removable from the envelope when portions of the lower longitudinal seam are opened, and the back pad shall be removable when a portion of one armhole seam is opened.

(c) *Pad inserts*—(1) *Forming, sealing, and distribution of fibrous glass.* The buoyant pad inserts shall be formed from two pieces of film cut to the patterns shown by Dwg. No. 160.005-1, Sheet 3, for adult size, and Sheet 5, for child size, which shall be heat-sealed tight. The heat-sealed pad seams shall show an adhesion of not less than 8 pounds when 1-inch strips cut across and perpendicular to the seams are pulled apart at a rate of separation of the clamping jaws of the test machine of 12 inches per minute. The pad inserts shall be filled with fibrous glass distributed as follows:

Table 160.005-4(c)(1)—DISTRIBUTION OF FIBROUS GLASS IN PAD INSERTS

	Model 52 (minimum)	Model 56 (minimum)
Front pad (2):		
Lower section	10.00 oz. each	6.50 oz. each.
Upper section	7.25 oz. each	4.75 oz. each.
Back pad	11.50 oz.	7.50 oz.
Total	46.00 oz.	30.00 oz.

(2) *Displacement of pad inserts.* The volume of the finished individual heat-sealed buoyant pad inserts shall be such as to provide buoyancy as set forth in the following table when tested in accordance with the method set forth in § 160.005-5(d), except that the period of submergence shall be only long enough to determine the displacement of the pads:

TABLE 160.005-4 (c) (2)—VOLUME DISPLACEMENT OF SEALED PADS

	Model 52	Model 56
Front pads	12½ lbs. each ± ¾ lb.	6½ lbs. each ± ½ lbs.
Back pads	8 lbs. each ± ½ lb.	4½ lbs. each ± ½ lb.

(d) *Tie tapes.* The tie tapes at the neck shall extend not less than 14 inches from the edge of the adult life preserver and not less than 12 inches from the edge of the child life preserver. They shall be stitched through both thicknesses of the envelope as shown by Dwg. No. 160.005-1, Sheet 1, for adult size, and Sheet 4, for child size, or by the alternate stitching shown on Sheet 2. The free ends shall be doubled over and stitched in accordance with Section E-E of Sheet 1.

(e) *Drawstrings.* The drawstrings at the waist shall extend not less than 8 inches from the edge of the life preserver and shall be secured in the drawstring tunnel as shown by Dwg. No. 160.005-1, Sheet 1, for adult size, and Sheet 4, for child size, or by the alternate stitching shown on Sheet 2. The free ends shall be doubled over and stitched in accordance with Section E-E of Sheet 1.

(f) *Body strap.* The body strap shall be fitted with a single dee ring on one end and with the arrangement of a snap hook and prethreaded double dee rings as shown on Dwg. No. 160.005-1, Sheet 1, on the other. The body strap shall be stitched as shown on the drawings, and the edge of the single dee ring shall be 20 inches from the center line for adult size and 15 inches for child size.

(g) *Reinforcing tape.* Binding tape shall be stitched approximately 15 inches for adult life preservers and 12 inches for child life preservers around the back of the neck, and also around the openings of the drawstring tunnel and around the bottom of the arm holes as indicated by the drawings.

(h) *Stitching.* All stitching shall be a short lock stitch conforming to Stitch Type 301 of Federal Standard No. 751, and there shall be not less than 7, nor more than 9 stitches to the inch.

(i) *Workmanship.* Life preservers shall be of first-class workmanship and shall be free from any defects materially affecting their appearance or serviceability.

[CGFR 53-25, 18 FR 7863, Dec. 5, 1953, as amended by CGFR 58-23, 23 FR 4628, June 25, 1958; CGFR 65-16, 30 FR 10898, Aug. 21, 1965]

§ 160.005-5 Sampling, tests, and inspections.[1]

(a) *General.* When production is to commence on life preservers or fibrous glass pad inserts for use in life preservers, the manufacturer shall notify the Officer in Charge, Marine Inspection, U.S. Coast Guard of the inspection zone in which the factory is located in sufficient time for him to assign a Coast Guard Marine Inspector to the plant to observe production methods and to conduct any inspections or tests which may be deemed advisable. Manufacturers of approved life preservers shall maintain quality control of the materials used, manufacturing operations, and the finished product so as to meet the requirements of this specification. When a lot of life preservers is presented for Coast Guard inspection, it is expected that the manufacturer will previously have taken all ordinary precautions to assure himself that the life preservers are in full compliance with the requirements of this specification. The Coast Guard inspections and tests are not intended to replace, or be a substitute for, full inspections and tests by the manufacturer to maintain the quality of his product. The Coast Guard Marine Inspector shall be admitted to any place in the factory where work is done on the life preservers or on component materials or parts. Samples of materials entering into construction may be taken by the marine inspector and tests made for compliance with the applicable requirements.

(b) *Lot size and sampling.* (1) A lot shall consist of not more than 500 life preservers. A new lot shall be started with any change or modification in materials used or manufacturing methods employed. When a lot of life preservers is ready for inspection, the manufacturer shall notify the Officer in Charge, Marine Inspection, U.S. Coast Guard, of the inspection zone in which the factory is located, who will assign a marine inspector to the plant for the purpose of making the necessary tests and inspections. From each lot of life preservers the marine inspector shall select samples in accordance with the following table to be tested for buoyancy in accordance with paragraph (d) of this section:

TABLE 160.005-5(b)(1)—SAMPLING FOR BUOYANCY TESTS

Lot size	*Number of life preservers in sample*
100 and under	1
101 to 200	2
201 to 300	3
301 to 500	4

(2) For a lot next succeeding one from which any sample life preserver failed the buoyancy test, the sample shall consist of not less than ten specimen life preservers to be tested for

---

[1] The manufacturer of a personal flotation device must meet 33 CFR 181.701 through 33 CFR 181.705 which require an instruction pamphlet for each device that is sold or offered for sale for use on recreational boats.

buoyancy in accordance with paragraph (d) of this section.

(c) *Test facilities.* The manufacturer shall provide a suitable place and the necessary apparatus for the use of the inspector in conducting tests to determine compliance of life preservers with this specification. The apparatus shall include accurate spring scales of adequate capacity, weighted wire mesh baskets, and a test tank or tanks which can be locked or sealed in such manner as to preclude disturbance of life preservers undergoing test or change in water level.

(d) *Buoyancy test.* Remove the buoyant pad inserts from the life preserver and cut three slits in the film on both sides of both the upper and lower sections of the front pads and three slits on both sides of the back pad. The slits shall be not less than 2 inches in length and spaced not less than 2 inches apart. Securely attach the spring scale in a position directly over the test tank. Suspend the weighted wire basket from the scale in such a manner that the basket may be weighed while it is completely under water. In order to measure the actual buoyancy provided by the pads, the underwater weight of the empty basket should exceed the buoyancy of the pads. To obtain the buoyancy of the pads, proceed as follows:

(1) Weigh the empty wire basket under water.

(2) Place the pads inside the basket, and submerge it so that the top of the basket is at least 2 inches below the surface of the water. Allow the pads to remain submerged for 48 hours. The tank shall be locked or sealed during this 48-hour submergence period. It is important that after the pads have once been submerged they shall remain submerged for the duration of the test, and at no time during the course of the test shall they be removed from the tank or otherwise exposed to air.

(3) After the 48-hour submergence period unlock or unseal the tank and weigh the wire basket with the pads inside while both are still under water.

(4) The buoyancy is computed as (1) minus (3).

(e) *Buoyancy required.* The buoyant pad inserts from Model 52 adult life preservers shall provide not less than 25 pounds buoyancy in fresh water, and the pads from Model 56 child life preservers shall provide not less than 16½ pounds buoyancy.

(f) *Lot inspection.* If the sample life preserver or preservers meet the buoyancy requirement, the marine inspector shall carefully inspect individually each of the life preservers in the lot, making such examination and tests as are necessary to satisfy himself that the life preservers have been manufactured according to this specification. Non-conforming units shall be eliminated. The manufacturer shall provide a well lighted place equipped with a suitable smooth top table for use by the marine inspector and shall provide labor for all handling of life preservers requisite to lot inspection.

(g) *Lot acceptance.* When the marine inspector has satisfied himself that the life preservers in the lot are of a type officially approved in the name of the company, and that such life preservers meet the requirements of this specification, they shall be plainly marked in waterproof ink with the words, "Inspected and Passed, (Date), Marine Inspection Office identification letters USCG."

(h) *Lot rejection.* If any sample life preserver fails the buoyancy test ten additional specimen life preservers shall be selected from the lot and tested for buoyancy. If all the ten additional specimen life preservers pass the buoyancy test, the lot shall be considered for lot inspection as set forth in paragraph (f) of this section. If any one of the ten additional specimen life preservers fails the buoyancy test, the lot shall be rejected. If in the lot inspection, three or more non-conforming units are eliminated for the same kind of defect, lot inspection shall be discontinued until such time as the manufacturer has inspected the remainder of the lot and eliminated or corrected additional units having the same kind of defect. Non-conforming units which have been eliminated in the lot inspection may be re-submitted for inspection, provided that all defects have been corrected to the satisfaction of the marine inspector. When permitted by the Commander of the Coast Guard District, rejected lots may be re-worked by the manufacturer to correct the deficiency for which they were rejected and to eliminate all non-conforming units, following which the remainder of the lot may be resubmitted for official testing and inspection. Life preservers from rejected lots may not, unless subsequently accepted, be sold or offered for sale under representation as being in compliance with this specification or as being approved for use on merchant vessels or motorboats.

(46 U.S.C. 375, 416; 49 U.S.C. 1655(b); 49 CFR 1.4(b), and 1.46)

[CGFR 53-25, 18 FR 7863, Dec. 5, 1953, as amended by CGFR 58-23, 23 FR 4629, June 25, 1958; CGD 75-186, 41 FR 10437, Mar. 11, 1976; CGD 75-008, 43 FR 9772, Mar. 9, 1978]

§ 160.005-6 Marking.

Each life preserver must have the following clearly marked in waterproof lettering on a front section:

(a) In letters three-fourths inch or more in height:

(1) Adult (for persons weighing over 90 pounds); or

(2) Child (for persons weighing less than 90 pounds).

(b) In letters capable of being read at a distance of 2 feet:

Type I—Personal Flotation Device.
Inspected and tested in accordance with U.S. Coast Guard regulations.
Fibrous glass buoyant material provides a minimum buoyant force of (25 lb. or 16½ lb.).
Approved for use on all vessels by persons weighing (90 lb. or more, or less than 90 lb).
U.S. Coast Guard Approval No. 160.005/(assigned manufacturer's No.)/(Revision No.). (Model No.);
(Name and address of manufacturer or distributor.).
(Lot No.).

[CGD 163R, 38 FR 8118, Mar. 28, 1973, as amended by CGD 75-008, 43 FR 9770, Mar. 9, 1978]

§ 160.005-7 Procedure for approval.

(a) *General.* Life preservers for use on merchant vessels or motorboats are approved only by the Commandant, U.S. Coast Guard, Washington, D.C. Each model life preserver is considered separately. Correspondence pertaining to the subject matter of this specification shall be addressed to the Commander of the Coast Guard District in which the factory is located. The Commander of the Coast Guard District will detail a marine inspector to the factory to observe the production facilities and manufacturing methods and to select, from not less than ten life preservers already manufactured, not less than three life preservers for test in accordance with §§ 160.005-4(c)(2) and 160.005-5(d). A copy of the marine inspector's report, together with a fourth specimen life preserver and one set of pad inserts selected from those already manufactured, will be forwarded to the Commandant for examination, and, if satisfactory an official approval number will be assigned to the manufacturer for the model life preserver submitted.

[CGFR 58-23, 23 FR 4629, June 25, 1958]

Subpart 160.006—Life Preservers; Repairing and Cleaning

AUTHORITY: R.S. 4417a, as amended, 4426, as amended, 4481, as amended, 4488, as amended, 4491, as amended, sec. 10, 35 Stat. 428, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, secs. 6, 17, 3, 54 Stat. 164, as amended, 166, as amended, 347, as amended, sec. 3, 70 Stat. 152, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 404, 481, 489, 395, 367, 526e, 526p, 1333, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120 July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-20, June 18, 1956, 21 FR 4894; CGFR 56-28, July 24, 1956, 21 FR 5659; 167-38, Oct. 26, 1959, 24 FR 8857.

SOURCE: 11 FR 187, Jan. 3, 1946; 11 FR 561, Jan. 12, 1946, unless otherwise noted.

§ 160.006-1 Applicable specifications.

(a) There are no other specifications applicable to this subpart.

§ 160.006-2 Repairing.

(a) *General.* No repairs, except in emergency, shall be made to an approved life preserver without advance notice to the Officer in Charge, Marine Inspection, of the district in which such repairs are to be made. Emergency repairs shall be reported as soon as practicable to the Officer in Charge, Marine Inspection.

(b) *Kind of repairs.* Except in emergency, tapes or straps may not be repaired, but may be renewed, and small holes, tears, or rips in the envelope cover fabric may be repaired, at the discretion of the Officer in Charge, Marine Inspection.

§ 160.006-4 Cleaning life preserver envelopes or covers.

(a) *General.* The envelopes or covers of life preservers of the removable filler type, i.e., cork, balsa wood, and removable pad fibrous filler types, may be cleaned or laundered by removing the buoyant fillers during the cleaning or laundering process and reinserting them into the envelopes or covers.

(b) *Procedure for approval.* No formal approval is required, but application for permission to clean or launder life preserver envelopes or covers where the buoyant fillers are removed during the cleaning process, shall be made to the Coast Guard District Commander of the district in which the work is to be done, and the Coast Guard District Commander may grant such permission at his discretion.

[11 FR 187, Jan. 3, 1946; 11 FR 10089, Sept. 11, 1946]

§ 160.006-5 Cleaning life preservers (where buoyancy fillers are not removed from envelope covers during cleaning process).

(a) *General.* Only life preservers of Coast Guard approved types shall be admitted to cleaning under Coast Guard supervision. Neither the formula for the cleaning solution nor the time and temperature limits are prescribed or restricted by this subpart, except that the strength of the tapes and fabric shall not be unduly lessened by the cleaning and the cleaned life preservers shall be in good condition and satisfactorily pass the buoyancy requirements specified below.

(b) *Inspections and tests*—(1) *General.* An inspector shall examine all cleaned life preservers at the place the work is done. Life preservers having tears, rips, weakened or broken straps, excessive weight, or other abnormalities as compared to new life preservers, shall be eliminated. He shall select from each lot of 250 or less cleaned life preservers, at least five life preservers to be tested for buoyancy. If the specimen life preservers all pass the buoyancy test described in paragraph (b)(2) of this section the lot shall be acceptable as to buoyancy. If any one of the specimen life preservers fails the buoyancy test, ten additional specimen life preservers shall be selected at random from the lot and tested for buoyancy. If all of the ten additional specimen life preservers pass the test, the lot shall be acceptable as to buoyancy. If any one of the ten additional specimen life preservers fails the buoyancy test, the lot shall be rejected. Rejected lots may be tested 100 percent by the cleaner and all non-conforming units eliminated, whereupon the remainder of the lot may be resubmitted for official inspection. When any specimen life preserver shall fail the buoyancy test, ten specimen life preservers shall be selected at random and tested from the next succeeding lot submitted for official inspection. When the inspector has satisfied himself that the life preservers are of approved types, are in good condition and are satisfactory as to buoyancy as shown by the tests of representative specimens, they shall be plainly marked in waterproof ink with the word "Passed (Marine Inspection Office identification letters, date)."

____

(inspector's initials), (port), date).

(2) *Buoyancy test.* The specimen cleaned life preserver shall be tested for buoyancy by placing it in a weighted wire cage which shall be submerged two hours in a tank of water so the top is approximately two inches below the surface. The weights shall be more than sufficient to submerge the cage with the inclosed life preserver. The buoyancy shall be determined to equal the weight of the weighted cage in water less the weight of the weighted cage in water with the life preserver inside. The adult life preserver shall support not less than 16½ pounds net weight, and the child life preserver shall support not less than 11 pounds net weight.

(c) *Marking.* Each life preserver cleaned or laundered shall be plainly marked in waterproof ink at or near the center of the jacket with the words "Cleaned By (name and address of company), (date)."

(d) *Procedure for approval.* Approval for cleaning or laundering life preservers as a unit, with the buoyancy fillers inside the covers, the whole being subjected to the cleaning or laundering process, is granted only by the Commandant, United States Coast Guard, Washington, D.C. 20226. Correspondence pertaining to the subject matter of this subpart shall be addressed to the Coast Guard District Commander of the district in which the factory is located. In order for a company to obtain approval, an inspector will be detailed to select at random not less than four specimen life preservers from among used, soiled life preservers offered for cleaning and will observe the specimens selected during the cleaning process in order to ascertain that they are cleaned in accordance with the company's stated description of the process. The cleaned specimen life preservers, together with four copies of the complete description of the procedure, including the formula for the cleaning solution and time and temperature for various operations, shall then be forwarded through the Coast Guard District Commander to the Commandant.

(46 U.S.C. 375, 416; 49 U.S.C. 1655(b); 49 CFR 1.4(b), and 1.46)

[11 FR 187, Jan. 23, 1946; 11 FR 10089, Sept. 11, 1946, as amended by CGFR 61-23, 26 FR 5758, June 28, 1961; CGD 75-186, 41 FR 10437, Mar. 11, 1976]

Subpart 160.009—Specification for a Buoy, Life Ring, Cork or Balsa Wood for Merchant Vessels and Boats

AUTHORITY: R.S. 4417a, as amended, 4426, as amended, 4488, as amended, 4491, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, secs. 6, 17, 3, 54 Stat. 164, as amended, 166, as amended, 347, as amended, sec. 3, 70 Stat. 152, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 404, 481, 489, 367, 526e, 526p, 1333, 390b, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120 July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-20, June 18, 1956, 21 FR 4894; CGFR 56-28, July 24, 1956, 21 FR 5659; 167-38, Oct. 26, 1959, 24 FR 8857.

§ 160.009-1 Incorporation by reference.

(a) *Specifications and standards.* This subpart makes reference to the following documents:

(1) Federal Specifications:

CCC-C-443E—Cloth, Cotton, Duck (Single and Plied Filling) Yarns, Flat.
T-R-605B—Rope, Manila and Sisal.
V-T-276H—Thread, Cotton.
V-T-291E—Thread, Linen.
V-T-295D—Thread, Nylon.

(2) Federal Standards:

No. 191—Textile Test Methods.
No. 595A—Colors.
No. 751A—Stitches, Seams, and Stitchings.

(3) Coast Guard specifications:

164.001—Cork, sheet.
164.002—Balsa wood.

(b) *Plan.* The following plan, of the issue in effect on the date ring life buoys are manufactured, forms a part of this specification:

Dwg. No. 160.009—Cork and balsa wood ring life buoy; arrangement and construction details.

(c) *Copies on file.* Copies of the specifications, standards and plan referred to in this section shall be kept on file by the manufacturer, together with the certificate of approval. The Coast Guard plan and specifications may be obtained upon request from the Commandant, U.S. Coast Guard, Washington, D.C. 20590. The Federal Specifications and Federal Standards may be purchased from the Business Service Center, General Services Administration, Washington, D.C., 20407.

[CGFR 65-64, 31 FR 562, Jan. 18, 1966, as amended by CGD 75-008, 43 FR 27153, 27154, June 22, 1978]

§ 160.009-2 Type and size.

(a) *Type.* Each ring life buoy specified in this subpart must be made of:

(1) Cork; or

(2) Balsa wood.

(b) *Sizes.* Ring life buoys shall be of the sizes set forth in the following table with the dimensions indicated:

TABLE 160.009-2 (b)—DIMENSIONS FOR LIFE BUOYS

Size	Outside diameter A (inches)	Inside diameter B (inches)	Cross section	
			Long diameter C (inches)	Short diameter D (inches)
30-inch	30	17	6½	3
24-inch	24	13	5½	3
20-inch	20	11	4½	3½

[CGFR 48-23, 13 FR 3536, June 26, 1948, as amended by CGD 72-163R, 38 FR 8118, Mar. 28, 1973]

§ 160.009-3 Materials.

(a) *Cork.* All sheet cork used in a cork ring life buoy must comply with Subpart 164.001 of this chapter.

(a-1) *Balsa wood.* All balsa wood used in a ring life buoy must comply with Subpart 164.002 of this chapter.

(b) *Cover.* The cover shall be cotton duck of a weight not less than 9.68 ounces per square yard, complying with Federal Specification CCC-C-443 for Type I and Type II material, except that the marine inspector may accept other cotton fabrics having not less weight and strength or weather-resistant synthetic fabrics having not less strength. Ring life buoys shall be either international orange (Color No. 12197 of Federal Standard 595) or natural beige in color and the color fastness shall be rated as "good" when tested in accordance with Federal Test Method Standard No. 191. Methods 5610, 5630, 5650, and 5660.

NOTE: On vessels on an international voyage, all ring life buoys shall be international orange in color.

(c) *Grabline.* The grabline may be ⅜-inch, three-strand (twelve yarns) manila, complying with Federal Specification T-R-605, or ⅜-inch polyethylene, polypropylene or other suitable buoyant type synthetic material having a minimum breaking strength of 1,350 pounds.

(d) *Beckets.* The beckets for securing the grabline shall be 2-inch polyethylene, polypropylene, nylon, saran, materials permitted for the cover, or other suitable webbing material having a minimum breaking strength of 585 pounds. In addition, polyethylene and polypropylene shall be a weather-resistant type which is stabilized as to heat, oxidation, and ultraviolet light degradation.

(e) *Thread.* The thread for securing the straps, cover and the grabline, shall be either nylon, Type II, Size 4, Class 2, of Federal Specification V-T-295; No. 16, three-cord linen thread, complying with Federal Specification V-T-291, Table I; or No. 10, 6-ply, glazed finish, heavy cotton thread, complying with Federal Specification V-T-276, Table IV, Type IIIB. Alternate threads will be given special consideration.

(f) *Glue.* The adhesive shall be of a waterproof resin type glue, complying with Federal Specification MMM-A-188.

(g) *Dowels.* The dowel pins or skewers shall be of white pine, birch, Douglas fir, or equivalent, approximately 3/16" in diameter, and of such length as to extend through the entire body of the buoy.

[CGFR 48-23, 23 FR 3536, June 26, 1948, as amended by CGFR 65-9, 30 FR 11464, Sept. 8, 1965; CGFR 65-64, 31 FR 562, Jan. 18, 1966; CGD 72-163R, 38 FR 8118, Mar. 28, 1973; CGD 78-012, 43 FR 27154, June 22, 1978]

§ 160.009-4 Construction, workmanship, and performance standards.

(a) *General.* This specification covers ring life buoys, consisting of a body constructed in the shape of a ring with an approximately elliptical cross section as illustrated by Drawing No. 160.009, which provide buoyancy to aid in keeping persons afloat in the water. Alternate arrangements meeting the performance requirements of this specification will be given special consideration.

(b) *Body*—(1) *Layers and segments.* The body shall be constructed of two or three layers of buoyant material with not more than the total number of segments shown in the table below for the sizes indicated. Minimum thickness per layer for two-layer construction shall be 1¼" and for three-layer construction ¾".

Two-Layer Construction

Size and number of segments allowed

30-inch: Maximum 18 (with not more than 12 in any one layer).

24-inch and 20-inch: Maximum 12 (with not more than 7 in any one layer).

Three-Layer Construction

30-inch: Maximum 24 (with not more than 6 in either outside layer nor more than 12 in the center layer).

24-inch and 20-inch: Maximum 18 (with not more than 5 in either outside layer nor more than 8 in the center layer).

(2) *Gluing and doweling.* The ends and edges of adjacent segments shall be fitted neatly and glued one to the other. The layers shall be neatly joined and securely glued together with butts and seams of adjacent layers being staggered. The body shall then be reinforced with not less than two dowels or skewers driven on each side of the joints on both sides of the body. The body shall then be clamped until the glue is dry.

(3) *Shaping and smooth finish.* The body shall be worked down to the shape illustrated on Dwg. No. 160.009 and sanded to a smooth finish.

(4) *Waterproof finish for balsa wood life ring buoys.* The entire finished body of each balsa wood ring life buoy must have a copious coat of waterproof glue that has dried thoroughly before the cover is placed on the buoy. The waterproof glue must be equivalent to the products having trade names of "Hydrotuf," "Synthetic Plasoleum," and "Balsa Wood Coating."

NOTE: "Hydrotuf", "Synthetic Plasoleum", and "Balsa Wood Coating" are trade names for waterproof substances for covering balsa wood furnished by Winner Mfg. Co., Inc., Trenton, New Jersey; Revertex Corp. of America, 3708 Northern Blvd., Long Island City, New York; and Akron Paint & Varnish Co. Akron, Ohio; respectively.

(c) *Cover.* The cover shall be of not more than two pieces, one for either side and shall be joined by stitching and seams as set forth in paragraph (f) of this section.

(d) *Beckets.* Each ring buoy shall be fitted with four beckets located at equidistant points about the body of the buoy. The beckets shall be 2 inches wide and shall be attached to the cover by stitching and seams as set forth in paragraph (f) of this section. Beckets made of materials permitted for the cover shall be made of double thickness with raw edges turned under. Beckets shall be so arranged to cover the cross section seams where the cover is joined.

(e) *Grabline.* The finished length of the grabline shall be four times the outside diameter of the buoy. The ends of the grabline shall be securely and neatly spliced together, or shall be hand whipped with a needle and both ends securely and smoothly seized together. It shall be festooned in bights around the buoy and pass through the beckets. The beckets shall be sewn tightly and securely to the grabline by a stitching as described in paragraph (f) of this section.

(f) *Stitching.* All machine stitching shall be a lock stitch conforming to stitch 301 of Federal Standard No. 751, and there shall be not less than 5 stitches to the inch. All hand stitching shall be made with double threads. The stitching around the inside perimeter of the buoy to close the cover shall be a hand rope stitch not less than 2 stitches to the inch. The beckets and grabline shall be attached as follows: The ends of the beckets shall be turned back at least 1 inch, one end to go around the grabline and the other to be laid against the first end. The beckets shall then be stitched to the grabline with not less than 5 hand stitches or machine stitched with not less than 3 stitches per inch. Both edges of the beckets shall be fastened to the inside perimeter of the buoy with a hand cross stitch. Alternate methods of rigging the beckets and grabline will be given special consideration.

(g) *Workmanship.* Ring life buoys shall be of first class workmanship and free from any defects materially affecting their appearance or serviceability.

(h) *Buoyancy.* Test specimens shall support the net weight as set forth in the following table for the sizes indicated when subjected to the test described in § 160.009-5(b):

Size	*Buoyancy, lbs.*
30-inch	32
24-inch	16½
20-inch	16½

(i) *Strength.* Test specimens shall not break or show rupture of the joints, nor shall there be an elongation of inside diameter of more than 1½ inches, when subjected to the test described in § 160.009-5(c).

[CGFR 48-23, 13 FR 3536, June 26, 1948, as amended by CGFR 65-9, 30 FR 11464, Sept. 8, 1965; CGD 72-163R, 38 FR 8118, Mar. 28, 1973]

§ 160.009-5 Inspections and tests.[1]

(a) *General.* A marine inspector shall examine all ring life buoys at the place of manufacture for compliance with this specification, and shall test each specimen ring life buoy for strength in accordance with the method set forth in paragraph (c) of this section, with the exception that the period of suspension shall be only long enough to permit a visual examination of the body to assure that the segments and joints are secure and the buoyant material not fractured. Specimens or samples of materials entering into the construction may be taken at random, either in the raw material state or during manufacture, by the inspector and tests made for compliance with the applicable requirements. After satisfying himself that ring life buoys have been manufactured according to this specification and are of a type officially approved in the name of the manufacturer, the inspector shall mark each ring life buoy plainly in waterproof ink as follows: On the nude body of the buoy—"Passed, U.S. Coast Guard (Inspection date), (Marine Inspection Office identification letters)", on the cover of the completed buoy—"Approved, U.S. Coast Guard, (Inspection date), (Marine Inspection Office identification letters)." If the inspector has any doubt regarding compliance with this specification, he may select specimens at random and conduct buoyancy and strength tests in accordance with paragraphs (b) and (c) of this section and such other tests as he may consider necessary, accepting or rejecting the ring life buoys at his discretion upon the basis of such tests. The manufacturer shall provide a suitable place and the necessary apparatus for the use of the inspector in conducting tests at the place of manufacture.

(b) *Test method; buoyancy.* (1) Weigh iron or other weight under water. The weight shall be more than sufficient to submerge the ring life buoy.

(2) Attach the iron or other weight to the ring life buoy and submerge with the top of the buoy approximately 2 inches below the surface for 48 hours.

(3) Weigh the buoy with iron or other weight attached while both the iron and the buoy are under water.

(4) The buoyancy (net weight the buoy will support) is considered to be the weight of the iron or other weight under water, paragraph (b)(1) of this section, minus the weight of the iron or other weight with the buoy attached under water, paragraph (b)(3) of this section.

(c) *Test method; strength.* Suspend the specimen ring life buoy body without covering in a vertical position by passing a strap approximately 2 inches in width through the buoy. Attach a weight of 200 pounds to another strap of the same width. Hang the weight from the buoy by passing the strap through the buoy. Allow the weight to hang suspended for 30 minutes.

(46 U.S.C. 375, 416; 49 U.S.C. 1655(b); 49 CFR 1.4(b); and 1.46)

[CGFR 48-23, 13 FR 3537, June 26, 1948, as amended by CGD 75-186, 41 FR 10437, Mar. 11, 1976; CGD 75-008, 43 FR 9772, Mar. 9, 1978]

§ 160.009-6 Marking.

Each ring life buoy must have the following information clearly marked in waterproof lettering:

(a) On the body:

Passed, U.S. Coast Guard, (Inspection Date), (Marine Inspection Office identification letters).

(Name and address of manufacturer or distributor)

(Size of buoy.)

Coast Guard Approval No. 160.009/assigned manufacturers' No.)/(revision No.).

---

[1] The manufacturer of a personal flotation device must meet 33 CFR 181.701 through 33 CFR 181.705 which require an instruction pamphlet for each device that is sold or offered for sale for use on recreational boats.

(b) On the cover:

Type IV Personal Flotation Device.
Inspected and tested in accordance with U.S. Coast Guard regulations.
(Cork or Balsa wood) buoyant material provides a minimum buoyant force of (32 lb. or 16½ lb.).
Approved for use on recreational boats less than 16 feet in length and all canoes and kayaks, and only as a throwable device on all other vessels.
Approved U.S. Coast Guard (inspection date) (Marine Inspection Office identification letters).
(Name and address of manufacturer or distributor.).
U.S. Coast Guard Approval No. 160.009/(assigned manufacturer's No.)/(Revision No.); (Model No.).
(Size.).
(Lot No.).

(46 U.S.C 375, 416; 49 U.S.C. 1655(b); 49 CFR 1.4(b), and 1.46)

[CGD 72-163R, 38 FR 8118, Mar. 28, 1973, as amended by CGD 75-186, 41 FR 10437, Mar. 11, 1976; CGD 75-008, 43 FR 9770, Mar. 9, 1978]

§ 160.009-7 Procedure for approval.

(a) *General.* Ring life buoys for use on merchant vessels and motorboats are approved only by the Commandant, U.S. Coast Guard, Washington, D.C. 20226. Correspondence relating to the subject matter of this specification shall be addressed to the Commander of the Coast Guard District in which the factory is located.

(b) *Preapproval tests.* Manufacturers who desire to manufacture ring life buoys complying with this specification shall apply to the Commander of the Coast Guard District in which the plant is located, who will detail an inspector to the plant to observe production facilities and manufacturing methods and to select at random from not less than 6 of each size ring life buoy for which approval is desired a sample of not less than two specimen buoys of each size with which he shall conduct buoyancy and strength tests in accordance with § 160.009-5(b) and (c) and make such other examinations as may be necessary to satisfy himself that the specimen buoys are in accordance with this specification. Upon completion of satisfactory tests, the inspector's report shall be forwarded to the Commandant for assignment of an official approval number for each size and type.

[CGFR 48-33, 13 FR 3537, June 26, 1948, as amended by CGFR 65-9, 30 FR 11464 Sept. 8, 1965]

Subpart 160.010—Buoyant Apparatus for Merchant Vessels

AUTHORITY: R.S. 4417a, as amended, 4426, as amended, 4488, as amended, 4491, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, secs. 6, 17, 3, 54 Stat. 164, as amended, 166, as amended 347, as amended, sec. 3, 70 Stat. 152, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 404, 481, 489, 367, 526e, 526p, 1333, 390b, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-20, June 18, 1956, 21 FR 4894; CGFR 56-28, July 24, 1956, 21 FR 5659; 167-38, Oct. 26, 1959, 24 FR 8857.

SOURCE: CGFR 49-43, 15 FR 114 Jan. 11, 1950, unless otherwise noted.

§ 160.010-1 Applicable specifications.

(a) The following specifications of the issue in effect on the date buoyant apparatus is manufactured, form a part of this subpart:

(1) Coast Guard specification:

164.002—Balsa Wood.

(2) Navy Department specification:

39B5—Balsa (Ochroma).

(3) Federal specifications:

C-G-496—Glue; Resin Type (Liquid and Powder).
V-T-276—Thread, Cotton.

(b) Copies of the above specifications shall be kept on file by the manufacturer together with the approved plans and certificate of approval.

§ 160.010-2 Types.

(a) *General.* Buoyant apparatus is defined as meaning flotation equipment (other than lifeboats, life buoys, life preservers, and buoyant cushions) designed to support a specified number of persons in the water, and of such construction that it retains its shape and properties and requires no adjustment or preparation for use. The types of buoyant apparatus generally in use are the box-float type and the peripheral-body type defined in paragraphs (b) and (c) of this section. Alternate arrangements which will meet the performance requirements of this specification will be given special consideration.

(b) *Box-float type.* Box-float type is defined as buoyant apparatus having a box-like shape and deriving its buoyancy from balsa wood or other solid buoyant material or metal air compartments inclosed in a wood frame and sheathing.

(c) *Peripheral-body type.* Peripheral-body type is defined as buoyant apparatus having a continuous body formed in the shape of either an ellipse or rectangle, and having a circular, elliptical, or rectangular body cross section, and deriving its buoyancy from balsa wood or other solid buoyant material or metal air compartments.

§ 160.010-3 General requirements for buoyant apparatus.

(a) Construction, materials, and workmanship shall provide a buoyant apparatus capable of passing the tests for strength, watertight integrity, buoyance, airtightness of air compartments, if any, and stability, as described in § 160.010-7.

(b) Materials not covered by this specification shall be of good quality and in all respects suitable for the purpose intended.

(c) Buoyant apparatus shall be effective and stable, floating either side up.

(d) Buoyant apparatus shall be of such size and strength that it can be handled without the use of mechanical appliances, and its weight shall not exceed 400 pounds.

(e) The air compartments or buoyant material shall be placed as near as possible to the sides of the apparatus, and buoyancy shall not be dependent upon inflation.

(f) It shall have a life line securely attached around the outside, festooned in bights not longer than 3 feet, with a seine float in each bight, which float may be omitted if the line is of an inherently buoyant material and absorbs little or no water. The life line shall be of a size and strength not less than ⅜-inch diameter manila. Pendants shall be fitted approximately 18 inches apart. Pendants shall be of a size and strength not less than ¼-inch diameter manila and shall be not less than 12 feet in length and secured in the middle. Pendants shall be made up in hanks, and the hanks shall be secured by not more than two turns of light twine. Peripheral-body type apparatus not fitted on the inside with a flush net or platform shall also be provided with a life line and pendants on the inside.

(g) Buoyant apparatus weighing 75 pounds or more shall be provided with a fitting or other arrangement for the attachment of a painter of a size not less than 2 inches in circumference.

(h) All edges and exposed corners shall be well rounded.

(i) Buoyant apparatus shall be of first class workmanship throughout.

[CGFR 49-43, 15 FR 114, Jan. 11, 1950, as amended by CGFR 58-44, 23 FR 8984, Nov. 9, 1958]

§ 160.010-4 Buoyant apparatus using balsa wood for buoyancy.

(a) Balsa wood shall comply with Coast Guard Specification 164.002 for Density A wood (8½ to 12 pounds per cubic foot) or with Navy Department Specification 39B5.

(b) Glues used shall conform to the requirements of Federal Specification C-G-496, and the gluing methods employed, including spreading weight, clamping pressures, temperatures of glue and atmosphere where work is done, and curing time and temperature, shall be in accordance with the recommendations of the manufacturer of the glue.

(c) The balsa wood pieces composing each layer shall be as large as practicable in order to keep the number of pieces and the number of seams and butts to a minimum, but no layer shall be less than 2 inches in thickness. The pieces shall be so arranged in adjacent layers that butts and seams are staggered in order to give maximum rigidity to the whole and to minimize all channels through which water might penetrate. The grain of the wood shall be so laid as to give minimum end grain on the outside surface of the finished body. The use of small pieces for filling purposes in the interior of the body is prohibited. The use of small pieces for fairing purposes on the exterior of the body will be permitted: *Provided*, That the grain complies with the above requirement and that the pieces are thoroughly glued in place. All butted ends shall be square and smooth. All sides shall be smooth and straight. All butts and seams shall be tightly fitted. The use of wood dowels or skewers ¼ inch in diameter and of a length as required to prevent slippage of balsa wood in adjacent layers when gluing will be permitted.

(d) Not less than 24 hours of the glue curing time shall elapse before shaping the balsa wood body. The rough body shall then be shaped down to its approximate final form. It shall be as smooth as practicable. If any gaps are found to exist in butts or seams, they shall be filled with balsa wood shims glued in.

(e) The balsa wood buoyant body, if to be used in a box-float type buoyant apparatus, shall be given a copious coating with a material found acceptable for this purpose. The body shall then be placed in the wood frame and solid wood sheathing shall be fitted to the frame and body so as to prevent movement of the body within the frame. The frame and sheating shall be Sitka spruce, Northern pine, or equivalent. The frame and sheathing shall be smooth, and shall present no cutting edges, points, or splinters, and shall be finished with two coats of water-resisting spar varnish or protective paint. No plywood shall be used for the frame or sheathing.

NOTE: "Hydrotuf" furnished by Atlantic-Pacific Mfg. Corp., 124 Atlantic Ave., Brooklyn, N.Y.; "Synthetic Plasoleum" furnished by Revertex Corp., of America, 3708 Northern Blvd., Long Island City, N. Y.; and "Balsa Wood Coating" furnished by Akron Paint and Varnish Co., Akron, Ohio; are coating materials which have been found acceptable. Other materials will be considered upon request.

(f) The balsa wood buoyant body, if to be used in a peripheral-body type buoyant apparatus, shall be covered with canvas of a strength and weight not less than No. 10. The canvas cover shall be set in and covered with a coating material found acceptable for this purpose. If the canvas cover is spirally wrapped on the body, each wrap shall overlap the preceding wrap by approximately half the width of the wrap. If stitching is required in making or applying the cover, it shall be a machine stitch not less than 5 stitches to the inch, or an overhand stitch with double threads, waxed, not less than 2 stitches to the inch. Thread shall have a strength not less than No. 10/6 cotton thread complying with the requirements of Federal Specification V-T-276 for Type III-B (18 pounds). After drying, the body shall be given not less than one coat of protective paint.

(g) The intent of paragraphs (a) through (f) of this section is to produce a compact buoyant body without channels or openings through which water may penetrate the interior, and that shall not only be waterproof at its exterior surface without the aid of further covering but that each piece of which it is constructed shall be a unit which will localize within itself any absorption due to exterior damage. Every effort shall be directed to this result during construction.

§ 160.010–5 Buoyant apparatus using air compartments for buoyancy.

(a) Air compartments shall be constructed of corrosion-resistant materials of sufficient thickness and strength so that the watertight integrity of the compartments will not be destroyed in the drop test for strength described in § 160.010–7(e).

(b) All joints of air compartments shall be securely hook-jointed and soldered, riveted, or properly and securely welded by certified welders using approved electrodes or welding rods.

(c) Air compartments shall be not more than 3 feet in length and in no case shall there be fewer than 6 air compartments for buoyant apparatus of 25-person or more capacity, or fewer than 4 air compartments for buoyant apparatus of less than 25-person capacity. Each air compartment shall be fitted with a standard ¼-inch pipe size test nipple and fitted with a hexagonal cap, both of corrosion-resistant materials, and be so located as to be readily accessible for testing purposes.

(d) Air compartments, if to be used in a box-float type buoyant apparatus shall not be placed in contact with other metal work. The frame and sheathing holding the air compartments shall meet the requirements of § 160.010-4(e).

§ 160.010-6 Capacity of buoyant apparatus.

(a) *General.* The number of persons for which a buoyant apparatus is approved shall be the lowest number ascertained by the following methods.

(1) Final buoyancy of the apparatus after the watertight integrity test as described by § 160.010-7(g) and (h), divided by 32. The above divisor shall be suitably increased where the apparatus is designed so that persons supported are only partially immersed or where facilities are provided for climbing on top of the apparatus.

(2) Number of feet in the outside perimeter of the apparatus. The inside edge of peripheral-body type apparatus (donut and similar shapes) shall not be considered in determining the capacity.

§ 160.010-7 Methods of sampling, inspections and tests.

(a) *General.* The marine inspector shall be admitted to the place of manufacture and will familiarize himself with the various operations involved in the construction process and, from observation during manufacture, satisfy himself that buoyant apparatus are made in general accordance with this subpart and of materials and parts conforming strictly with the plans and specifications submitted by the manufacturer and approved by the Commandant. The manufacturer shall provide a suitable place and the necessary apparatus for the use of the inspector in conducting such production check tests as are done at the place of manufacture. Specimens or samplings of materials entering into construction may be taken at random, either in the raw material state or during manufacture, by the inspector, and tests made for compliance with the applicable requirements.

(b) *Factory inspections of production lots.* Buoyant apparatus shall receive 100 percent surface inspection by the inspector before covering or before inserting the air compartments or buoyant material in the frame and sheathing, as the case may be, to determine compliance with the requirements of this subpart and conformance with the plans and specifications submitted by the manufacturer and approved by the Commandant. All air compartments shall be tested in accordance with paragraph (f) of this section. The inspector shall witness the entire construction of at least two buoyant apparatus from each lot produced.

(c) *Sampling of production lots.* A production lot shall consist of not more than 50 buoyant apparatus of the same design and capacity manufactured by one factory. For lots of at least 30 but not more than 50 buoyant apparatus, the sample shall consist of at least 2 representative complete specimen buoyant apparatus selected at random from the lot by the inspector. For lots of less than 30 buoyant apparatus, the sample shall consist of at least 1 representative complete specimen buoyant apparatus selected at random by the inspector.

(d) *Testing of sample buoyant apparatus from production lots.* Each sample buoyant apparatus selected for test from a production lot shall be subjected to the tests described in paragraphs (e) to (h), inclusive, of this section. The stability test, paragraph (i) of this section, ordinarily is not performed on samples from production lots, but may be done whenever question as to stability arises.

(e) *Strength test.* Drop or launch the complete sample buoyant apparatus into still water from a height of 60 feet. Test all air compartments, if any, in accordance with paragraph (f) of this section. There shall be no damage affecting the serviceability of the apparatus for the purpose intended. Upon application from the manufacturer, consideration will be given to the use of a beam loading test in lieu of the drop test for samples from production lots of balsa wood buoyant apparatus of the peripheral-body type.

(f) *Test for airtight integrity of air compartments.* Subject each air compartment to an air pressure of approximately one pound per square inch. Caps shall be removed from the test nipples of adjacent compartments, allowing them to vent to the atmosphere, during this test. There shall be no leakage or structural weakness evidenced.

(g) *Watertight integrity test.* Determine the initial buoyancy of the sample buoyant apparatus in accordance with paragraph (h) of this section. Submerge the buoyant apparatus for 24 hours at a depth of 10 feet or equivalent water pressure. Determine the final buoyancy of the buoyant apparatus in accordance with paragraph (h) of this section. The final buoyancy shall be at least 32 pounds per person capacity of the buoyant apparatus, or 40 pounds per person capacity if the apparatus is designed so that persons supported are only partially immersed or if facilities are provided for climbing on top of the apparatus. The loss of buoyancy shall not exceed 5 percent of the initial buoyancy, except that the water absorption in the wood sheathing of the box-float type shall not be included in computing the 5 percent buoyancy loss.

(h) *Buoyancy test.* Load known weights on the sample buoyant apparatus until it is awash. The buoyancy shall be computed as equaling the downward gravitational force exerted by the weights loaded on the apparatus, whether the weights are submerged or not. A raised platform of known weight having two runners on edge spaced so as to bear on the apparatus may be used to support the weights out of water to avoid the necessity for making allowances for the displacement of submerged weights.

(i) *Stability test.* With the sample buoyant apparatus floating in water, a weight of 15 pounds of iron per foot of length shall be suspended in the water from the life lines along one edge. The same test shall be performed per foot of width. The minimum weight along any one edge shall be 60 pounds. The buoyant apparatus shall neither capsize nor become partially awash under either of these tests.

(j) *Lot acceptance or rejection.* The nameplates of buoyant apparatus accepted shall be marked with the Marine Inspection Office identification letters, the date, and the letters, "U.S.C.G." Inability of a sample buoyant apparatus to pass the tests scheduled in paragraph (d) of this section shall be considered cause for rejection of the lot. A rejected lot may be reworked by the manufacturer to correct the kind of defect(s) found and be re-submitted for inspection and testing.

(46 U.S.C. 375, 416; 49 U.S.C. 1655(b); 49 CFR 1.4(b), and 1.46)

[CGFR 49-43, 15 FR 114, Jan. 11, 1950, as amended by CGFR 53-56, 18 FR 8583, Dec. 19, 1953; CGD 75-186, 41 FR 10437, Mar. 11, 1976]

§ 160.010-8 Nameplate and marking.

(a) A substantial corrosion-resistant nameplate shall be permanently attached to each buoyant apparatus on which is stamped the name of the manufacturer, symbol and/or serial number, approval number, dimensions, and number of persons capacity. Space shall be provided for the Marine Inspection Office identification letters, the date, and the letters, "U.S.C.G."

(46 U.S.C. 375, 416; 49 U.S.C. 1655(b); 49 CFR 1.4(b), and 1.46)

[CGFR 49-43, 15 FR 114, Jan. 11, 1950, as amended by CGD 75-186, 41 FR 10437, Mar. 11, 1976]

§ 160.010-9 Procedure for approval.

(a) Buoyant apparatus for use on merchant vessels are approved only by the Commandant, United States Coast Guard, Washington, D.C. Before any action is taken on any design of buoyant apparatus, detailed plans covering fully the arrangement and construction of the buoyant apparatus material specifications, and description of construction methods shall be submitted to the Commandant through the Commander of the Coast Guard District in which the buoyant apparatus is built.

(b) If the drawings and specifications are satisfactory, the Commander of the Coast Guard District in which the buoyant apparatus is to be built shall be notified in writing when fabrication is to commence. An inspector will be assigned to observe the construction in accordance with the plans and specifications, and upon completion will conduct the tests described by § 160.010-7, (e) to (i).

(c) At the time that the tests are successfully completed, the manufacturer shall present to the inspector four copies of the plans and specifications, including any corrections, changes, or additions which may have been found necessary during construction or testing. If the manufacturer desires more than one set of approved plans, additional copies shall be submitted at that time.

(d) The marine inspector will file a report of the examinations and tests, together with the four copies of the corrected drawings and specifications, with the Commander of the Coast Guard District, who will transmit them to the Commandant to determine compliance with the requirements of this subpart and suitability of the buoyant apparatus for type or brand approval for use on merchant vessels.

Subpart 160.011—Gas Masks, Self-Contained Breathing Apparatus, and Supplied-Air Respirators, for Merchant Vessels

AUTHORITY: 4417a, as amended, 4426, as amended, 4488, as amended, 4491, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, sec. 3, 54 Stat. 347, as amended, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 404, 481, 489, 367, 1333, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14 Nov. 26, 1954, 19 FR 8026; 167-20, June 18, 1956, 21 FR 4894, CGFR 56-28, July 24, 1956, 21 FR 5659; 167-38, Oct. 26, 1959, 24 FR 8857.

SOURCE: CGFR 50-12, 15 FR 3093, May 20, 1950, unless otherwise noted.

§ 160.011-1 Applicable schedules.

(a) The following schedules, of the issues in effect on the date respiratory protective devices are manufactured form a part of this subpart:

(1) U. S. Bureau of Mines:

Schedule 13C, Procedure for Testing Self-Contained Breathing Apparatus for Permissibility.

Schedule 14E, Procedure for Testing Gas Masks for Permissibility.

Schedule 19A, Procedure for Testing Supplied-Air Respirators for Permissibility.

(b) Copies of the above schedules shall be kept on file by the manufacturer, together with the approved plans and certificate of approval issued by the Coast Guard.

§ 160.011-2 Types.

(a) Respiratory protective devices specified by this subpart for use on merchant vessels shall be of three types, i.e., self-contained breathing apparatus, gas mask, or Type A supplied-air respirator (hose mask), all in accordance with the applicable schedules of the U.S. Bureau of Mines.

§ 160.011-3 Requirements.

(a) The materials, construction, workmanship, and performance requirements are that the device shall have met the applicable requirements of, and be approved by, the U.S. Bureau of Mines. Respiratory protective devices are further considered by the Coast Guard relative to their suitability for use on shipboard, particularly with regard to the kind of protection afforded by the device as against the kind of hazards expected aboard ship, and with regard to the bulk and weight of the device as against shipboard conditions of limited space and arrangements of accommodations, ladders, scuttles, hatches, etc.

§ 160.011-4 Inspections and tests.

(a) Respiratory protective devices are not inspected at regularly scheduled factory inspections by the Coast Guard. A pre-approval sample device is examined and may be tested with respect to its suitability for shipboard use.

§ 160.011-5 Marking.

(a) No additional marking to that required by the U.S. Bureau of Mines for their approval is required by the Coast Guard.

§ 160.011-6 Procedure for approval.

(a) *General.* Respiratory protective devices are approved for use on merchant vessels only by the Commandant, United States Coast Guard, Washington, D.C., 20226. Correspondence relating to the subject matter of this specification shall be addressed to the Commander of the Coast Guard District in which such devices are manufactured.

(b) *Pre-approval sample and plan.* In order to apply for approval of a respiratory protective device for use on merchant vessels, submit one complete sample and one recharge (where used) together with four copies of an arrangement plan (parts drawings are not required) and of the approval label authorized by the U. S. Bureau of Mines, to the Commander of the Coast Guard District in which the device is manufactured, who will forward same to the Commandant for determination as to its suitability for use on merchant vessels.

Subpart 160.012 [Reserved]

Subpart 160.013—Hatchets (Lifeboat and Liferaft) for Merchant Vessels

AUTHORITY: R.S. 4417a, as amended, 4426, as amended, 4488, as amended, 4491, as amended, sec. 10, 35 Stat. 428, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, sec. 3, 54 Stat. 347, as amended, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 404, 481, 489, 395, 367, 1333, 50 U.S.C. 198; E.O. 11239: Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-20, June 18, 1956, 21 FR 4894; CGFR 56-28, July 24, 1956, 21 FR 5659; 167-38, Oct. 26, 1959, 24 FR 8857.

§ 160.013-1 Applicable specification and plan.

(a) *Specification.* The following specification, of the issue in effect on the date hatchets are manufactured, forms a part of this subpart:

(1) Federal Specification:

GGG-A-926—Axes.

(b) *Plan.* The following plan, of the issue in effect on the date hatchets are manufactured, forms a part of this subpart:

(1) Dwg. No. 160.013-1 (b)—Hatchet (Lifeboat and Life Raft).

(c) *Copy on file.* A copy of the specification and plan referred to in this section shall be kept on file by the manufacturer, together with the approved plans and certificate of approval. They shall be kept for a period consisting of the duration of approval and 6 months after termination of approval. The Federal specification may be purchased from the Business Service Center, General Services Administration, Washington, D.C., 20407. The Coast Guard plan may be obtained upon request from the Commandant, U.S. Coast Guard, Washington, D.C., 20226.

[CGFR 49-43, 15 FR 116, Jan. 11, 1950, as amended by CGFR 61-23, 26 FR 5758, June 28, 1961; CGFR 65-16, 30 FR 10898, Aug. 21, 1965]

§ 160.013-2 Type and size.

(a) *Type.* Hatchets specified by this subpart shall be Type I, Class I, Design D or E, as described in Federal Specification GGG-A-926, but other hatchets equal in strength and construction will be given special consideration.

(b) *Size.* Hatchets specified by this subpart shall be of one size, and the dimensions shall be approximately in conformance with Drawing No. 160.013-1(b).

[CGFR 49-43, 15 FR 116, Jan. 11, 1950, as amended by CGFR 61-23, 26 FR 5759, June 28, 1961]

§ 160.013-3 Materials, workmanship, and construction details.

(a) *General.* All materials, workmanship, and construction details shall be in substantial compliance with the provisions of Federal Specification GGG-A-926, except as provided for in this subpart.

(b) *Handle.* A ½-inch diameter hole shall be bored in the hatchet handle in the approximate location shown on DWG No. 160.013-1(b). and the edges of the hole on both sides of the handle shall be rounded off to remove rough edges.

(c) *Lanyard.* Hatchets specified by this subpart shall be provided with a lanyard of ¼-inch diameter, 3-strand rope-laid line not less than 6 feet in length. Lanyards shall be cotton, jute, or other suitable material. The lanyard shall be attached to the hatchet by threading one end through the hole in the hatchet handle and securing the rope end by splicing or by a bowline or other suitable knot.

(d) *Sheath.* No sheaths are to be provided for hatchets specified by this subpart.

[CGFR 49-43, 15 FR 116, Jan. 11, 1950, as amended by CGFR 61-23, 26 FR 5759, June 28, 1961]

§ 160.013-4 Inspections and tests.

(a) *General.* Hatchets specified by this subpart are not inspected at regularly scheduled factory inspections; however, the Commander of the Coast Guard District in which hatchets are manufactured may detail an inspector at any time to visit places where hatchets are manufactured to check materials and construction methods and to conduct such tests and examinations as may be required to satisfy himself that hatchets are being manufactured in compliance with the requirements of this specification and are suitable for the intended purpose. The manufacturer shall admit the inspector to his plant and shall provide a suitable place and the necessary apparatus for the use of the inspector in conducting tests at the place of manufacture.

[CGFR 49-43, 15 FR 116, Jan. 11, 1950]

§ 160.013-5 Marking.

(a) *General.* Hatchets specified by this subpart shall be stamped or otherwise permanently marked in a legible manner on the side of the head with the manufacturer's name or with a trade mark of such known character that the source of manufacture may be readily determined, and with the manufacturer's type or size designation.

[CGFR 49-43, 15 FR 116, Jan. 11, 1950]

§ 160.013-6 Procedure for approval.

(a) *General.* Hatchets are approved only by the Commandant, United States Coast Guard, Washington, D.C., 20226. Correspondence relating to the subject matter of this specification shall be addressed to the Commander of the Coast Guard District in which the factory is located.

(b) *Pre-approval sample and plans.* Manufacturers who desire to manufacture approved hatchets shall submit to the Commander of the Coast Guard District in which the factory is located one sample hatchet, together with four copies of fully-dimensioned descriptive drawings showing all materials, finishes, etc., for the hatchet. The Commander of the Coast Guard District will forward the sample hatchet and the drawings to the Commandant to determine compliance with this subpart and suitability of the hatchet for type or brand approval for use in lifeboats and life rafts on merchant vessels.

[CGFR 49-43, 15 FR 116, Jan. 11, 1950, as amended by CGFR 65-16, 30 FR 10898, Aug. 21, 1965]

Subpart 160.015—Lifeboat Winches for Merchant Vessels

AUTHORITY: R.S. 4417a, as amended, 4426, as amended, 4488, as amended, 4491, as amended, sec. 10, 35 Stat. 428, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 404, 481, 489, 395, 367, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-20, June 18, 1956, 21 FR 4894, CGFR 56-28 July 24, 1956, 21 FR 5659; 167-38, Oct. 26, 1959, 24 FR 8857.

§ 160.015-1 Applicable regulations.

(a) *Regulations.* The following regulations of the issue in effect on the date lifeboat winches are manufactured, form a part of this subpart.

(1) Coast Guard regulations; Electrical Engineering Regulations, CG-259 (46 CFR (Subchapter J) Parts 110 to 113, inclusive of this chapter).

(2) Coast Guard regulations; Marine Engineering Regulations (46 CFR Subchapter F, Parts 50 to 63, inclusive in this chapter).

(b) *Copies on file.* A copy of the regulations referred to in this section shall be kept on file by the manufacturer, together with the approved plans, material affidavits, and the certificate of approval.

[CGFR 58-31, 23 FR 6883, Sept. 6, 1958, as amended by CGD 72-133R, 37 FR 17038, Aug. 24, 1972]

§ 160.015-2 General requirements for lifeboat winches.

(a) The requirements of this subpart apply to all new construction of lifeboat winches. Lifeboat winches approved and in use prior to the regulations in this subpart may be continued in service if in satisfactory condition.

(b) Lifeboat winches for use with gravity davits shall have grooved drums of such size that there will be only one wrap of wire on the drum. Lifeboat winches for use with mechanical davits need not be grooved and may be designed to take more than one wrap.

(c) Lifeboat winches shall be designed to lower under the force of gravity alone. There shall be no provisions for power lowering. A suitable hand wheel shall be attached to the winch to overhaul the falls in addition to any hand cranks provided.

(d) If the lifeboat winch is to be used in conjunction with nested lifeboats where the same falls are used for both boats, suitable means shall be provided for rapidly retrieving the falls by hand power.

(e) The installation of lifeboat winches shall be such that the fleet angle for grooved drums does not exceed 8 degrees, and for nongrooved drums does not exceed 4 degrees.

(f) Suitable hand cranks shall be provided for hoisting in addition to any other means for hoisting.

(g) Suitable fabric covers shall be provided, so fitted over exposed mechanisms that ice formations may be readily broken adrift when necessary to operate the winch.

(h) Falls shall not lead past any position that may be needed for the operation of the winch, such as hand cranks, pay-out wheels, brake levers, etc.

(i) Where falls lead along a deck they shall be suitably covered and so arranged that the top of the cover does not exceed 12 inches above the deck.

(j) Lifeboat winches shall be so designed that when located aboard merchant vessels the operator can observe the movement of the lifeboat during the lowering operation.

(k) For the purpose of calculations and conducting tests, the working load is the maximum load in pounds applied to the winch for which approval is desired.

(k-1) The exterior of a winch shall be designed to minimize such crevices, pockets, and inaccessible areas that when corroded would require disassembly of the winch for their scaling and painting.

(l) The requirements of this subpart shall be complied with unless other arrangements in matters of construction details, design, strength, equivalent in safety and efficiency are approved by the Commandant.

[CGFR 49-18, 14 FR 5111, Aug. 17, 1949, as amended by CGFR 58-31, 23 FR 6883, Sept. 6, 1958; CGD 72-133R, 37 FR 17038, Aug. 24, 1972]

§ 160.015-3 Construction of lifeboat winches.

(a) Lifeboat winches shall be of such strength that the lifeboat may be lowered safely with its full complement of persons and equipment. Additionally, a lifeboat winch used in hoisting an emergency lifeboat of a passenger vessel shall be capable of meeting the test specified in § 160.015-5(b)(9). A minimum factor of safety of six on the ultimate strength of the material shall be maintained at all times based on the approved working load.

(b) Worm gears, spur gears, or a combination of both, may be used in the construction of lifeboat winches. All gears shall be machine cut and made of steel, bronze, or other suitable material properly keyed to shafts. The use of cast iron is not permitted for these parts.

(c) Screws, nuts, bolts, pins, keys, etc., securing moving parts shall be fitted with suitable lock washers, cotter pins, or locks to prevent them from coming adrift.

(d) Drums shall be so arranged as to keep the falls separate, and to pay out the falls at the same rate. Clutches between the drums shall not be permitted unless bolted locking devices are used.

(e) The diameter of the drums shall be at least 16 times the diameter of the falls.

(f) A weighted lever hand brake shall be used to control the lowering by the lifeboat winch. It shall be of a type which is normally in the "on" position unless manually held in the "off" position, and shall return to the "on" position as soon as the brake lever is released.

(g) In addition to the hand brake, a governor type brake shall be fitted so as to control the speed of lowering of the lifeboat in accordance with § 160.015-5(b)(4) and (5).

(h) Positive means of lubrication shall be provided for all bearings. When worm gears are used the worm wheel shall operate in an oil bath. Means shall be provided so that the oil level in the gear case may be easily checked. The manufacturer shall furnish a lubrication chart for each winch together with a plate attached to the winch indicating the lubricant recommended for extremes in temperature.

(i) When lifeboat winches are fitted with power for hoisting, a suitable clutch shall be fitted to disengage the power installation during the lowering operation. In addition, the air or electric power outlet for a portable power unit shall be located adjacent to the winch where the unit is to be coupled. This power outlet shall be interconnected with and protected by the same system of safety devices as required for winches with built-in-motors.

(j) Where power-driven lifeboat winches are used, including those driven by portable power units, such as air or electric drills, positive means shall be provided for controlling the power to the lifeboat winch. This shall be so arranged that the operator must hold the master switch or controller in the "on" or "hoist" position for hoisting, and when released will immediately shut off the power.

(k) Limit switch and emergency disconnect switch requirements:

(1) A main line emergency disconnect switch shall be provided, the opening of which will disconnect all electrical potential to the lifeboat winch. This switch shall be located in a position accessible to the person in charge of the boat stowage, and for gravity davit installations, shall be in a position from which the movement of both davit arms can be observed as they approach the final stowed position.

(2) Where power driven winches are used with gravity davits, two limit switches, one for each davit arm, shall be provided to limit the travel of the davit arms as they approach the final stowed position. These switches shall be connected in series, they may be connected in either the control or the power circuit, and they shall be so arranged that the opening of either switch will disconnect all electrical potential of the circuit in which the switches are connected. These switches shall be arranged to stop the travel of the davit arms not less than 12 inches from their final stowed position and they shall remain open until the davit arms move outboard beyond the tripping position of the switches.

(3) Other arrangements equivalent in design and safety will be given special consideration.

(l) Where power driven winches are used, satisfactory means shall be provided to disconnect power to the winch before a hand crank can be engaged with the winch operating shaft, and this interruption of power shall be maintained while the hand crank is so engaged. Mechanical means for accomplishing the above, such as throw-out couplings on the sockets of the hand cranks, will be given special consideration.

(m) Motors, switches, controls, cables, etc., shall be of the waterproof type if installed on an open deck. Controls may be of the dripproof type if installed in a deck house or under deck. Installations shall be in accordance with Subchapter J (Electrical Engineering) of this chapter (Electrical Engineering Regulations, CG-259).

(n) All moving parts shall have suitable guards.

(o) Welding, when employed, shall be performed by welders certified by the U. S. Coast Guard, American Bureau of Shipping, or U.S. Navy Department, and the electrodes used shall be of an approved type.

(p) Inspection openings shall be provided in the winch housing or the housing itself shall be so arranged as to permit examination of the internal working parts.

(q) Motor clutches, when used, shall be of either frictional or positive engaging type. When one motor is used for two winches, the clutch shall be so arranged that only one winch shall be engaged at any one time. The clutch operating lever shall be capable of remaining in any position when subject to vibration and shall be so arranged that when in neutral position, both lifeboats may be lowered simultaneously.

[CGFR 49-18, 14 FR 5111, Aug. 17, 1949, as amended by CGFR 51-20, 16 FR 5443, June 8, 1951; CGFR 58-31, 23 FR 6883, Sept. 6, 1958; CGFR 65-9, 30 FR 11465, Sept. 8, 1965; CGD 72-133R, 37 FR 17039, Aug. 24, 1972; CGD 73-103R, 39 FR 11273, Mar. 27, 1974]

§ 160.015–4 Capacity of lifeboat winches.

(a) A lifeboat winch shall be approved for a working load after it has been demonstrated by detailed calculations that this working load can be carried with a minimum factor of safety of six based on the ultimate strengths of the materials. It will also be necessary to conduct the tests specified in § 160.015-5

[CGFR 49-18, 14 FR 5111, Aug. 17, 1949]

§ 160.015–5 Inspection and testing of lifeboat winches.

(a) *Material testing.* (1) The manufacturer shall furnish affidavits relative to the physical and chemical properties of the materials. Such affidavits shall be furnished by the foundry or mill supplying the material.

(b) *Factory test for initial approval.* (1) Lifeboat winches shall be tested for strength and operation at a place chosen by the manufacturer of the winch in the presence of an inspector. The lifeboat winch under test shall be set up similar to the intended shipbroad installation. In the case of a lifeboat winch with nongrooved drums, the drums shall be built up or sufficiently filled with wire to simulate the maximum number of wraps for which the winch is to be approved. The tests to be conducted are as noted in paragraphs (b)(2) to (8) of this section. The limiting values of velocities and the 2 foot braking distance set forth in the following paragraphs of this section are the values to be actually achieved with the specific arrangement of falls contemplated for the shipboard installation. If a different arrangement of falls is used to facilitate testing, due consideration shall be given to the use of limiting velocities, braking distances, and test weights which will be equivalent to the test performed with an arrangement of falls identical to that used for the shipboard installation.

(2) A pull of 2.2 times the working load, equally divided between drums, shall be applied in a direction similar to a shipboard installation. The test weight producing this load shall be dropped through a distance of not less than 15 feet, at which time this weight shall be stopped within a distance of 2 feet by action of the counterweight alone on the hand brake.

(3) A test identical to that noted in paragraph (b)(2) of this section shall be conducted after the braking surfaces have been thoroughly wetted. The test weight shall be stopped by the action of the counterweight alone within a distance of 6 feet. The test need only be applied to lifeboat winches having external brakes.

(4) With a pull equal to the working load, it shall be determined that the governor brake will limit the speed of lowering of the test weight to a maximum of 120 feet per minute, except that, in the case of winches designed for use with emergency lifeboats aboard passenger vessels, the speed of lowering shall not exceed 160 feet per minute.

(5) With a pull equal to 0.3 times the working load, it shall be determined that the winch will lower the test weight at not less than 40 feet per minute, except that, in the case of winches designed for use with emergency lifeboats aboard passenger vessels, the speed of lowering shall not be less than 60 feet per minute.

(6) With a pull equal to the working load, the test weight shall be lowered and raised a sufficient number of times so that the combined lowering distance is not less than 500 feet. This test is to determine the efficiency of the lifeboat winch for prolonged service.

(7) With a pull equal to 0.5 times the working load, it shall be demonstrated that the lifeboat winch can be hand operated by hoisting the test weight without undue effort. For gravity davits, it shall be demonstrated that this test weight can be carried easily from a point at which the traveling

blocks of the falls are 1 foot below their outboard, two-blocked position, and then up and around the bend of the trackways to the stowed position of the lifeboat.

(8) Where a quick return mechanism is installed it shall be demonstrated that a weight equal to 2.2 times the weight of the empty blocks can be handily retrieved through the regular reeving of the falls at a rate of not less than 40 feet per minute at the drum by one man.

(9) The following test applies to a lifeboat winch used for hoisting an emergency lifeboat of a passenger vessel. With a weight equal to the weight of the emergency lifeboat and its full complement of persons and equipment, it shall be demonstrated that the weight can be hoisted through the regular reeving of the falls at a rate of not less than 20 feet per minute, to the embarkation position.

(10) After the tests noted in paragraphs (b)(2) to (9) of this section have been conducted, the winch shall be completely disassembled and the marine inspector shall ascertain that no undue stress or wear has been incurred.

(c) *Factory testing after approval.* (1) After a design of a lifeboat winch has been approved, subsequent winches of the same design shall be individually tested as described in paragraph (c)(2) of this section.

(2) Each lifeboat winch shall be set up in a manner similar to that described in paragraph (c)(1) of this section. With a pull equal to 1.1 times the working load, the test weight shall be dropped through a distance of not less than 15 feet, at which time the load shall be stopped by the action of the counterweight alone. This test is to demonstrate the operation of the winch, and if satisfactory, no further test need be required. However, if the inspector is not satisfied with the operation of the winch, a complete test as noted in paragraph (b) of this section may be required.

(d) *Name plate.* (1) A corrosion resistant name plate shall be affixed to each lifeboat winch on which shall be stamped the name of the manufacturer, approval number, maximum working load in pounds pull at the drums, maximum working load in pounds pull per fall type and serial number, together with the Marine Inspection Office identification letters, the date, and the letters U.S.C.G.

(46 U.S.C. 375, 416; 49 U.S.C. 1655(b); 49 CFR 1.4(b), and 1.46)

[CGFR 49-18, 14 FR 5112, Aug. 17, 1949, as amended by CGFR 58-31, 23 FR 6883, Sept. 6, 1958; CGFR 65-9, 30 FR 11465, Sept. 8, 1965; CGD 72-133R, 37 FR 17039, Aug. 24, 1972; CGD 75-186, 41 FR 10437, Mar. 11, 1976]

§ 160.015-6 Procedure for approval of lifeboat winches.

(a) Before action is taken on any design of lifeboat winch, detail plans covering fully the arrangement and construction of the lifeboat winch, a complete bill of material setting forth the physical properties of the materials used, and strength calculations, shall be submitted to the Commandant through the Commander of the Coast Guard District having jurisdiction over the construction of the lifeboat winch.

(b) If the drawings required in paragraph (a) of this section are satisfactory, the Commander of the Coast Guard District in which the lifeboat winch is to be built, shall be notified in writing when fabrication is to commence. An inspector will be assigned to supervise the construction in accordance with the plans and upon completion, conduct the tests required by § 160.015-5.

(c) At the time that the tests are successfully completed, the manufacturer shall present to the inspector four corrected copies of the plans noted in paragraph (a) of this section, including any corrections, changes, or additions which may have been found necessary during construction or testing. If the manufacturer desires more than one set of approved plans, additional copies shall be submitted at that time.

(d) Upon receipt of corrected drawings, material affidavits, and satisfactory test report, the Commandant will issue a certificate of approval. No change shall be made in the design or construction without first receiving permission of the Commandant via the Commander of the Coast Guard District in which the lifeboat winch is built.

[CGFR 49-18, 14 FR 5112, Aug. 17, 1949, as amended by CGFR 58-31, 23 FR 6884, Sept. 6, 1958]

Subpart 160.016—Lamps, Safety, Flame, for Merchant Vessels

AUTHORITY: R.S. 4417a, as amended, 4488, as amended, 4491, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, sec. 3, 54 Stat. 347, as amended, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 481, 489, 367; 1333, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-38, Oct. 26, 1959, 24 FR 8857.

SOURCE: CGFR 50-12, 15 FR 3093, May 20, 1950, unless otherwise noted.

§ 160.016-1 Applicable specification.

(a) The following specification of the issue in effect on the date flame safety lamps are manufactured forms a part of this subpart:

(1) Military specification:

MIL-L-1204, Lamps, Safety, Flame.

(b) A copy of the above specification shall be kept on file by the manufacturer together with the approved plan and certificate of approval issued by the Coast Guard.

§ 160.016-2 Requirements.

(a) Flame safety lamps for use on merchant vessels shall comply with the construction requirements of Military Specification MIL-L-1204.

§ 160.016-3 Inspections and tests.

(a) Flame safety lamps are not inspected at regularly scheduled factory inspections, but the Commander of the Coast Guard District in which the factory is located may detail an inspector at any time to visit any place where approved flame safety lamps are being manufactured to satisfy himself that they are being made in accordance with the requirements of this subpart.

§ 160.016-4 Marking.

(a) Flame safety lamps shall be permanently and legibly marked with the name and address of the manufacturer and the type or model designation for the lamp.

§ 160.016-5 Procedure for approval.

(a) *General.* Flame safety lamps are approved for use on merchant vessels only by the Commandant, United States Coast Guard, Washington, D.C. 20226. Correspondence relating to the subject matter of this specification shall be addressed to the Commander of the Coast Guard District in which such devices are manufactured.

(b) *Pre-approval sample and plan.* In order to apply for approval of a flame safety lamp for use on merchant vessels, submit one complete sample, together with four copies of an arrangement plan (parts drawings are not required), together with a statement that the lamp meets the construction requirements of Military Specification MIL-L-1204, as amended, to the Commander of the Coast Guard District who will forward same to the Commandant for determination as to its suitability for use on merchant vessels.

Subpart 160.017—Ladders, Embarkation-Debarkation (Flexible), for Merchant Vessels

AUTHORITY: R.S. 4417a, as amended, 4426, as amended, 4488, as amended, 4491, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, sec. 3, 54 Stat. 347, as amended, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 404, 481, 489, 367, 1333, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-20, June 18, 1956, 21 FR 4894; 167-38, Oct. 26, 1959, 24 FR 8857.

SOURCE: 21 FR 6711, Sept. 6, 1956, unless otherwise noted.

§ 160.017-1 Applicable specifications.

(a) *Specifications.* The following specifications, of the issue in effect on the date embarkation-debarkation ladders are manufactured, formed a part of this subpart:

(1) Federal specifications:

RR-C-271—Chain and Attachments, Welded, Weldless, and Roller Chain.

TT-W-572—Wood Preservative, Water Repellent.

T-R-605—Rope, Manila and Sisal.

(2) Military specifications:

MIL-R-16060—Rope, Manila; and Substitutes.

(b) *Plans.* The following plans, of the issue in effect on the date embarkation-debarkation ladders are manufactured, form a part of this subpart:

(1) Drawing No. 160.017-1 (b):

Sheet 1—Type I Embarkation-Debarkation Ladder.
Sheet 2—Type II Embarkation-Debarkation Ladder.

(c) *Copies on file.* Copies of the specifications and plans referred to in this section shall be kept on file by the manufacturer, together with a copy of this specification, the approved plans, and the certificate of approval. They shall be kept for a period consisting of the duration of approval and 6 months after termination of approval. The Coast Guard specifications and plans may be obtained upon request from the Commandant, U.S. Coast Guard, Washington, D.C. 20226. The Federal specifications may be purchased from the Business Service Center, General Services Administration, Washington, D.C. 20407.

[21 FR 6711, Sept. 6, 1956, as amended by CGFR 65-16, 30 FR 10898, Aug. 21, 1965]

§ 160.017-2 Types.

(a) Ladders specified by this subpart shall be of two types as follows with materials and construction details in substantial agreements with those specified herein, but alternate arrangements will be given special consideration.

Type I—Rope Suspension Ladders.
Type II—Chain Suspension Ladders.

§ 160.017-3 Materials for Type I ladders.

(a) *Suspension members.* Suspension members for Type I ladders shall be not less than 2-inch circumference (approx. ⅝" diameter) mildew-resistant manila rope in accordance with the requirements of Federal specifications T-R-605, and shall have a breaking strength of not less than 4,400 pounds.

(b) *Spacer ears and rungs.* Spacer ears and rungs for Type I ladders shall be made from hickory, oak, ash, maple, beech, or other approved hardwood, which is straight-grained and free from knots, checks, honeycomb, warp or other detrimental defects.

(c) *Thimbles and other hardware.* The rope thimbles, bolts for ears, and any other metal hardware used in the construction of Type I ladders shall be of corrosion-resistant materials or steel protected against corrosion by galvanizing applied by the hot dip process.

[21 FR 6711, Sept. 6, 1956, as amended by CGFR 65-16, 30 FR 10898, Aug. 21, 1965]

§ 160.017-4 Materials for Type II ladders.

(a) *Suspension members.* Suspension members for Type II ladders shall be 7-0, single-loop, weldless, lock-link pattern galvanized steel chain in accordance with the requirements of Federal Specification RR-C-271 for Type II, Class I, chain, and shall have a minimum breaking strength of 3,560 pounds.

(b) *Spacer ears.* Spacer ears for Type II ladders may be either steel or wood. Steel ears shall be made from sheet steel not lighter than No. 14 U.S. Standard Gage (0.0747 inch nominal thickness). Wooden ears shall be made of hardwood as specified in § 160.017-3(b) for Type I ladders.

(c) *Rungs.* Rungs for Type II ladders shall be made of hardwood as specified in § 160.017-3(b) for Type I ladders.

(d) *Lashing rings.* Lashing rings shall be ⅜" × 3" galvanized steel rings.

(e) *Miscellaneous metal parts.* Chain clips, rung clips, bolts, rivets, and other miscellaneous metal parts for Type II ladders shall be of adequate size and strength and of materials suitable for the purpose.

§ 160.017-5 Construction of Type I ladders.

(a) *General.* Type I ladders shall be constructed in general agreement with the details shown on Drawing No. 160.017-1(b), Sheet 1, with double rope suspension members, double wooden rungs, and suitably shaped wooden spacer ears. The spacing between steps shall be uniform. The steps shall be 13 to 15 inches apart, and the distance between the thimbles at the top and the first step shall be approximately 24 inches. The suspension members shall be served with a good grade of common tarred marline for a distance of at least 1 inch above and below the spacer ears and for a distance of at least 2 inches below the thimbles. The clear passage width shall be not less than 19 inches.

(b) *Spacer ears.* The spacer ears shall be oval-shaped with a major diameter of approximately 8½ inches and a minor diameter of not less than 5 inches. The ears shall be not less than 1¼ inches in thickness and shall be uniform in size and shape. The edges of the ears shall be grooved to take the rope suspension members, and suitable slots shall be milled out to take the rungs as indicated on the drawing. All surfaces of the ears shall be worked down to a smooth finish. Four ⅜-inch diameter holes shall be drilled in each ear at the approximate locations shown on the drawing, and the rope suspension members secured to the ears with two turns of tarred marline as shown. The ears shall also be drilled as indicated on the drawing to take the bolt attaching the rungs to the ears.

(c) *Rungs.* Each step shall consist of two wooden rungs. The rungs shall be rectangular in shape, approximately 2⅛ inches in width and not less than 1 inch in thickness, and all longitudinal edges of the rungs shall be slightly rounded or chamfered. The rungs of each step shall be spaced a uniform distance apart, not less than 1½ inches and not more than 2½ inches, and when the ladder is assembled, the edges of the rungs shall project slightly beyond the edges of the suspension members so that the rope will not rub on the side of the vessel when the ladder is in use. The rungs shall be attached to the ears with ¼-inch carriage bolts, and shall be counterbored so that the bolt heads and nuts do not project into the rope groove. The bolt ends shall be securely peened over.

(d) *Thimbles.* Standard rope thimbles shall be fitted at the top of each suspension member as shown on the drawing.

(e) *Wood preservative.* After forming, finishing, and drilling of all necessary holes, etc., the completed rungs and ears shall be treated with two brush coats, with 24 hours drying time between coats, or with one dip coat of water repellent wood preservative complying with the requirements of Federal Specification TT-W-572 for Type A or B preservative.

[21 FR 6711, Sept. 6, 1956, as amended by CGFR 65-9, 30 FR 11465, Sept. 8, 1965]

§ 160.017-6 Construction of Type II ladders.

(a) *General.* Type II ladders shall be constructed in general agreement with the details shown on Drawing No. 160.017-1(b), Sheet 2, with chain suspension members, double wooden rungs, and suitably shaped spacer ears. The spacing between the steps shall be uniform. The steps shall be approximately 15¼ inches apart, and the distance between the top lashing rings and the first step and the bottom lashing rings and the last step shall be approximately 24 inches. The clear passage width shall be not less than 19 inches.

(b) *Spacer ears.* The ears shall be uniform in size, and either elliptical or rectangular in shape. Wooden ears shall be not less than 1¼ inches in thickness. Rectangular ears shall be not less than 8½ inches nor more than 10 inches in length and not less than 5 inches in width, with the corners rounded to a 1-inch radius. Elliptical ears shall have a major diameter of approximately 10 inches and a minor diameter of not less than 5 inches. All surfaces of wooden ears shall be worked down to a smooth finish and all edges suitably rounded. Metal ears shall have one or more stamped or formed ribs and the edges of the ears shall be turned or rolled similarly to that indicated on Drawing No. 160.017-1(b), Sheet 2, with the flange thus formed not less than ⅝ inch in width. Ears shall be attached to chain suspension members by use of bolts or rivets and a clip arrangement as indicated on the drawing, or by other suitable means.

(c) *Rungs.* Each step shall consist of two wooden rungs secured in such a manner that the rungs will not turn within the attachment or on the attached suspension member. The rungs shall be rectangular in shape, not less than 1½ inches in width and not less than 1 inch in thickness, and all longitudinal edges of the rungs shall be slightly rounded or chamfered. The rungs of each step shall be spaced a uniform distance apart, not less than 1½ inches and not more than 2½ inches. The attachment of the rung steps to the ears shall be by one of the following methods:

(1) By channel shaped clips approximately 1⅛ inches in depth by 1¼ inches flange width by not less than 4½ inches in length attached to the rungs, ears, and suspension members by bolts or rivets.

(2) By a section of the ears (steel ears only) stamped out to form a suitable channel clip to hold the rungs and attached to the rungs with bolts or rivets. In ears with stamped out clips, not less than 3/16-inch diameter holes shall be drilled out prior to stamping at the points where the corners of the clips will fall so that the ends of the cuts will terminate in these holes.

(d) *Lashing rings.* A lashing ring shall be attached to the top of each suspension member by a reverse lock-link shackle made from chain of a size and strength not less than the suspension member, which is locked by a button head rivet not less than 9/32 inch in diameter, and with suitable countersunk clinch ring so formed that when the rivet is peened over, the rivet and clinch ring form a rounded surface. A lashing ring shall be attached to the bottom of each chain suspension member by a ¼-inch diameter screw pin anchor shackle with the screw pin securely peened over. A suitable thimble or wear plate shall be fitted between the top chain links and the lashing rings and between the bottom chain links and the anchor shackles.

(e) *Galvanizing of steel parts.* All steel parts shall be treated to resist corrosion by galvanizing applied by the hot dip process after the parts have been formed.

(f) *Wood preservative.* After forming, finishing, and drilling of all necessary holes, etc., all wooden parts shall be treated with two brush coats, with 24 hours drying time between coats, or with one dip coat of water repellent wood preservative complying with the requirements of Federal Specification TT-W-572 for Type A or B preservative.

[21 FR 6711, Sept. 6, 1956, as amended by CGFR 65-9, 30 FR 11465, Sept. 8, 1965]

§ 160.017-7 Performance and workmanship requirements.

(a) *Strength (steps).* With the assembled ladder supported in such a manner that the test load shall act on both the step and its attachments a total static load of 700 pounds shall be applied separately to each of six steps for a duration of approximately one minute per step. The load shall be uniformly distributed over approximatelv 4 inches of contact surface at the center of the step. The step shall not fail nor shall there be any cracking, permanent set, or any other sign of weakness in the step or its attachments.

(b) *Strength (ladder).* The assembled, rolled up ladder, of the full length as supplied to the purchaser, shall be dropped freely so that it will fetch up on the secured end. With the ladder suspended full length vertically, a total static load of 2,000 pounds shall be applied to the lower end of the ladder in such manner as to be distributed equally between the two suspension members. There shall be no flaking or peeling of the finish on the component parts, the flexibility of the suspension members shall not be impaired, nor shall there be any other sign of weakness or injury to the ladder.

(c) *Workmanship.* Finished ladders shall be free from splinters, burrs, sharp corners, or projections which might be injurious to the hands or feet and other defects materially affecting their appearance or serviceability and workmanship shall be first-class throughout.

§ 160.017-8 Inspections and tests.

(a) A marine inspector shall examine all ladders at the place of manufacture for compliance with this specification. Samples of materials entering into construction may be taken at random by the inspector and tests made for compliance with the applicable requirements. After satisfying himself that the ladders have been manufactured according to this specification and the manufacturer's drawings and specifications as approved by the commandant, he shall select indiscriminately from each lot offered for inspection at least one ladder to be tested in accordance with § 160.017-7 (a) and (b). If the specimen ladder passes the tests, the lot shall be acceptable. If the specimen ladder fails any of the tests, the lot shall be rejected. Rejected lots may, when permitted by the inspector, be reworked by the manufacturer to correct the defect causing rejection and be re-submitted for official inspection. A copy of the inspector's report of the tests, including the lot number and serial numbers of ladders passed and rejected, shall be forwarded to the Commandant (MMT).

§ 160.017-9 Marking.

(a) Each ladder shall be branded or otherwise permanently and legibly marked on the rungs or ears, at intervals of not more than 5 feet, with the name of the manufacturer, the manufacturer's brand or model designation, the serial number of the ladder, the lot number, the Coast Guard Type number, and the Coast Guard approval number. Lots shall be numbered serially by the manufacturer and shall consist of all ladders of the same type and model offered for inspection at one time.

§ 160.017-10 Procedure for approval.

(a) Embarkation-debarkation ladders for use on merchant vessels are approved only by the Commandant, U.S. Coast Guard, Washington, D.C., 20226. Before any action is taken on any design of embarkation-debarkation ladder, detailed plans covering fully the arrangement and construction of the ladder, material specifications, and a description of the construction methods shall be submitted to the Commandant through the Commander of the Coast Guard District in which the ladder is to be manufactured.

(b) If the drawings and specifications are found satisfactory, the Commander of the Coast Guard District shall be notified in writing when fabrication is to commence. A marine inspector will be assigned to observe the construction in accordance with the plans and specifications and upon completion of a sample ladder at least 40 feet in length, he will conduct the tests described by § 160.017-7(a) and (b).

(c) After the tests are successfully completed, the manufacturer shall present to the inspector four copies of the plans and specifications, including any changes or additions which may have been found necessary during construction or testing. If the manufacturer desires more than one set of approved plans, additional copies shall be submitted at that time.

(d) The inspector will file a report of the examinations and tests, together with the four copies of the plans and specifications, with the Commander of the Coast Guard District, who will transmit them to the Commandant to determine compliance with the requirements of this subpart and suitability of the ladder for type or brand approval for use on merchant vessels.

[21 FR 6711, Sept. 6, 1956, as amended by CGFR 65-16, 30 FR 10898, Aug. 21, 1965]

Subpart 160.018—Life Rafts for Merchant Vessels

AUTHORITY: R.S. 4417a, as amended, 4426, as amended, 4481, as amended, 4488, as amended, 4491, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, sec. 3, 54 Stat. 347, as amended, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 404, 481, 489, 367, 1333, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-20, June 18, 1956, 21 FR 4894; 167-38, Oct. 26, 1959, 24 FR 8857.

SOURCE: CGFR 49-43, 15 FR 118, Jan. 11, 1950, unless otherwise noted.

§ 160.018-1 Applicable specifications.

(a) There are no other specifications applicable to this subpart.

§ 160.018-2 Types.

(a) Life rafts covered by this subpart shall be either of two types, Type A, cockpit type, or Type B, catamaran type as defined by paragraphs (b) and (c) of this section.

(b) Type A, cockpit type life rafts shall consist of side and end buoyancy chambers together with equipment and provision compartments, surrounding a watertight cockpit or well deck. Passengers are seated on the benches forming the top surfaces of the raft with their feet in the well deck space. Type A rafts are required in ocean and coastwise service and their use is optional for service on other waters.

(c) Type B, catamaran type life rafts shall consist of two longitudinal buoyancy chambers united by a suitable framework, the whole forming a flush deck raft with suitable hatches in the deck allowing entry into the provision and equipment compartments located between the buoyancy chambers. This type raft is for use in service other than ocean and coastwise.

§ 160.018-3 Construction; general.

(a) The requirements of this subpart apply to all new construction. Life rafts approved and in use prior to these regulations may be continued in service if in satisfactory condition.

(b) The requirements of this subpart for type of construction, material, etc., shall be complied with unless other arrangements in matters of construction details, design, or strength, equivalent in safety and efficiency are approved by the Commandant.

(c) Life rafts may be either reversible or self-righting, but if a raft is reversible the equipment and provisions shall be accessible from either side. The stowage of equipment shall be such as to withstand any shock received in launching. Life rafts should be as light as possible without sacrifice in strength and of such design that they can be rowed. Provisions shall be made so that the life raft can be boarded easily from the water by a swimmer. The strength of a life raft shall be sufficient to withstand satisfactorily the required strength tests as outlined in § 160.018-7. The buoyancy compartments should be placed as near as possible to the sides of the raft and the buoyancy shall not depend on air or gas chambers which require inflation, or on loose, granular or similar material. A minimum of 3 cubic feet of watertight air space or equivalent buoyancy shall be provided for each person to be carried.

(d) All ferrous metals shall be protected by hot dip galvanizing or by other acceptable means. All external parts shall be protected by two coats of a suitable marine paint. All seams and joints in plating, unless otherwise specified, shall be properly double riveted, or securely welded by certified welders using approved electrodes or welding rods. All edges and exposed corners should be well rounded and the outside of the raft shall be free from sharp protrusions. Surfaces shall be as smooth as possible and projecting bolt heads, lugs, etc., avoided.

§ 160.018-4 Construction; Type A; cockpit type.

(a) Type A life raft shall be constructed in such manner as to keep the well deck as free as possible from water, and drainage shall be provided in the form of scuppers with suitable plugs on chains, in the cockpit corners. At least one square inch of scupper area shall be provided for each ten square feet of area inclosed within the bulwarks.

(b) Each life raft shall be fitted with bulwarks at least 4 inches high. The side bulwarks shall be spaced 8 feet no inches (8′0″) from outside to outside in order to facilitate launching from a standard life raft skid, or a suitable cradle may be used to adapt the raft to the standard life raft skid.

(c) All wood framing, wood decks, etc., where used, shall be secured with bolts and washers or other approved means.

(d) Side and end benches shall be at least 18 inches wide and thwarts, if fitted, shall be at least 7½ inches wide. All seats should be approximately 15 inches above the well deck for passenger comfort and so arranged as to prevent the collection of water. The edges of all seats shall be rounded to at least a ½-inch radius.

(e) Two grab rails or bars shall be fitted extending completely around the raft.

(f) Rowlocks and rowlock sockets for each deck shall be provided as follows:

Two in each side bulwark and one in each of the end bulwarks.

(g) Lifting rings or shackles and attachments shall be provided as necessary. The strength of all lifting devices and attachments combined shall be sufficient to support four times the weight of the fully equipped raft.

(h) Stowage compartments shall be entered through the vertical side of the cockpit and each compartment shall be watertight with a closing device of sufficient size so that all items in the compartment may be easily reached. Metal used in the construction of buoyancy chambers or watertight equipment lockers shall be not less than 16 U.S. Standard gage. Such compartments shall be fitted with a ¼-inch standard pipe size testing nipple with hexagonal corrosion resistant cap so placed as to be accessible for testing purposes. Where air compartments of any description are used for buoyancy no one compartment shall be of greater capacity than 8 cubic feet and a minimum of 10 compartments of approximately equal size shall be provided.

§ 160.018–5 Construction; Type B; catamaran type.

(a) Type B life rafts shall be constructed with the longitudinal buoyancy chamber bound to the body of the raft by retaining bands and these retaining bands shall be made so that the buoyancy chambers may be detached for inspection, cleaning, and painting without disassembling the body of the raft. The buoyancy chamber on each side of the raft shall be divided into a minimum of 3 watertight compartments of approximately equal length. The longest length of any compartment shall be 3 feet. Each compartment shall be fitted with a ¼-inch pipe size testing nipple with hexagonal corrosion resistant cap so placed as to be accessible for testing purposes.

(b) Stowage compartments shall be entered from the top and bottom and each compartment shall be watertight with a closing device of suitable size so arranged that all items in the compartments may be easily reached. That portion of the raft deck over the stowage compartments may be hinged or sliding for access into the compartments.

(c) A life line shall be securely attached around the outside of the life raft, festooned in bights not longer than 3 feet, with a seine float in each bight, which float may be omitted if the line is of an inherently buoyant material and absorbs little or no water. The life line shall be of a size and strength not less than ⅜-inch diameter manila.

(d) Rowlocks and rowlock sockets for each deck shall be provided as follows: Two in each side bulwark and one in one of the end bulwarks.

(e) Lifting rings or shackles and attachments shall be provided as necessary. The strength of all lifting devices and attachments combined shall be sufficient to support four times the weight of the fully equipped raft.

[CGFR 49-43, 15 FR 118, Jan. 11, 1950, as amended by CGFR 58-44, 23 FR 8984, Nov. 9, 1958]

§ 160.018–6 Capacity.

(a) The number of persons for which a life raft may be rated is determined as noted in paragraphs (b), (c), or (d) of this section and the smallest number obtained is the number to be allowed.

(b) The number of persons to be permitted in a life raft shall not exceed the number obtained by dividing the deck area inclosed within the bulwarks, in square feet, by four for Type A rafts, and by three for Type B rafts.

(c) The number of persons permitted in any life raft shall not exceed the number wearing life jackets that can be seated comfortably without interfering with the use of the oars. This number shall be determined by test as set forth in § 160.018-7(f).

(d) The number of persons permitted in a Type A life raft shall not exceed the number for which seating space is provided as determined by superimposing figures with outline as shown in Figure 160.018-6(d) made to scale, on a plan of the raft.

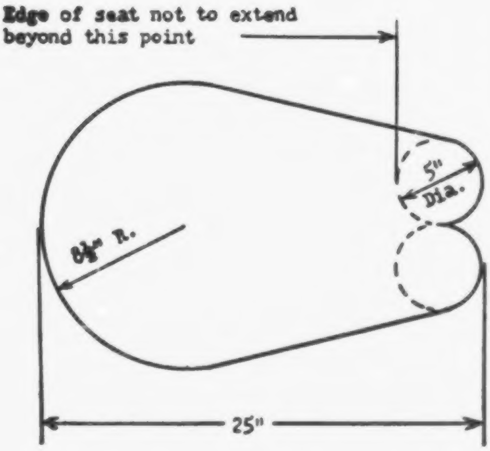


FIGURE 160.018–6(d).

§ 160.018–7 Inspection and testing.

(a) *Inspection.* Life rafts shall be inspected during the course of construction to determine that the arrangement and the materials entering into the construction are in accordance with the approved plans and the workmanship is of good quality. All watertight compartments in each raft built shall be tested for tightness with an air pressure of approximately one pound per square inch. The caps shall be removed from adjacent compartments while the test pressure is applied. There shall be no evidence of leakage or structural weakness.

(b) *Tests.* Before approval is granted to any design of life raft the tests outlined in the following paragraphs in this section must be completed satisfactorily in the presence of an inspector. For calculations and test purposes, the weight of one person is assumed to be 165 pounds

(c) *Drop test.* One test raft shall be dropped from the required test height into the water in each of three positions successively; endwise, sidewise, and flat. The required test height is 45 feet for Type A life rafts, and 25 feet for Type B life rafts. For this test, all equipment including provisions shall be on board the raft in their proper position. No substitutes will be permitted for the equipment in this test. Damage as a result of this test shall not be sufficient to render the raft or the equipment unserviceable. The air pressure test for watertight compartments in those rafts subjected to the drop test should be performed at this time.

(d) *Freeboard test.* A test raft with all equipment aboard including provisions shall be loaded with a weight equivalent to the full complement for which approval is desired, in such manner as to be at designed trim. The freeboard test shall be conducted after the drop test and if solid buoyancy is used in lieu of air tanks, the raft shall be allowed to remain 48 hours in this condition before measurements are taken. The platform of Type B rafts shall be at least 6 inches above the water in loaded condition and the well deck of Type A rafts shall be at least 2½ inches above the water in loaded condition.

(e) *Stability test.* Immediately after the freeboard test, with the raft in the same condition of loading, add a weight of 330 pounds (equivalent to the weight of two men) just inside the bulwark at one side to test for transverse stability. Move this additional weight to one end to test for longitudinal stability. No part of the well deck of a Type A raft or the platform of a Type B raft shall be submerged by this test.

(f) *Seating test.* Place in the life raft the number of persons, wearing life preservers, for which approval is desired and row a sufficient distance to demonstrate that the raft is not overcrowded. At this time, it should be determined if the maneuverability of the raft is satisfactory.

(g) *Production check tests.* After approval is granted to a life raft design, each raft built shall be checked by a marine inspector as noted in paragraph (a) of this section. One raft in each group of not more than 15 shall be selected at random by the inspector and shall be dropped into the water in one of the three standard positions from a height of not less than 45 feet for Type A or 25 feet for Type B. A different position shall be used for each successive raft tested so that out of each lot of 45 rafts constructed all three positions will have been used once.

§ 160.018-8 Marking.

(a) Each life raft shall have permanently attached a substantial corrosion resistant nameplate, on which is stamped the name of the manufacturer, the approval number, the dimensions of the raft, the type of raft, the manufacturer's symbol and/or serial number, the number of persons for which the raft is approved, together with the Marine Inspection Office identification letters, the date, and the letters "U.S.C.G."

(46 U.S.C. 375, 416; 49 U.S.C. 1655(b); 49 CFR 1.4(b), and 1.46)

[CGFR 49-43, 15 FR 118, Jan. 11, 1950, as amended, by CGD 75-186, 41 FR 10437, Mar. 11, 1976]

§ 160.018-9 Procedure for approval.

(a) Before action is taken on any design of life raft, detailed plans covering fully the arrangement and construction of the life raft, material specifications, stowage arrangement and seating arrangement shall be submitted to the Commandant through the Commander of the Coast Guard District in which the life raft is built.

(b) If the drawings required by paragraph (a) of this section are satisfactory, the Commander of the Coast Guard District in which the raft is to be built shall be notified in writing by the manufacturer when the fabrication is to begin. An inspector will be assigned to supervise the construction in accordance with the plans and upon completion, conduct the tests required by § 160.018-7.

(c) At the time the tests are successfully completed, the manufacturer shall present to the inspector 4 copies of the plans noted in paragraph (a) of this section, including any correction, changes or additions which may have been found necessary since the original submittal. If the manufacturer desires more than one set of plans on which Coast Guard approval is indicated, additional copies should be supplied at that time. A copy of the approved plans and certificate of approval shall be kept on file by the manufacturer.

(d) The marine inspector will file a report of the examinations and tests, together with the four copies of the corrected plans and specifications, with the Commander of the Coast Guard District who will transmit them to the Commandant for action concerning approval for use on merchant vessel.

Subpart 160.021—Hand Red Flare Distress Signals

AUTHORITY: 46 U.S.C. 481, 49 U.S.C. 1655(b)(1), 49 CFR 1.46(b).

SOURCE: CGD 76-048a and 76-048b, 44 FR 73060, Dec. 17, 1979, unless otherwise noted.

§ 160.021-1 Incorporations by reference.

(a) The following is incorporated by reference into this subpart:

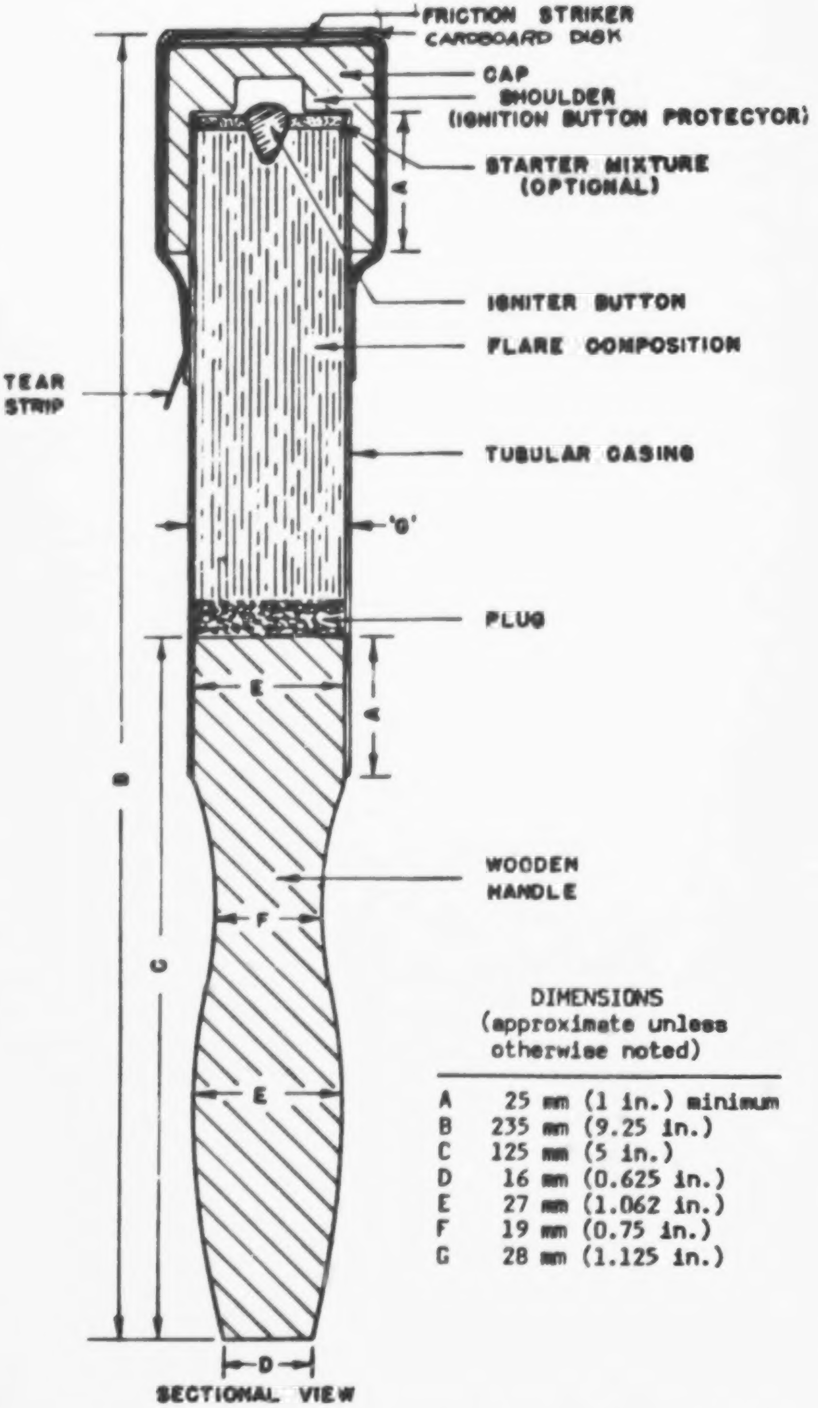
(1) "The Universal Color Language" and "The Color Names Dictionary" in *Color: Universal Language and Dictionary of Names*, National Bureau of Standards Special Publication 440, December 1976.

(b) NBS Special Publication 440 may be obtained by ordering from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 (Order by SD Catalog No. C13.10:440).

(c) Approval to incorporate by reference the publication listed in this section was obtained from the Director of the Federal Register on November 1, 1979. The publication is on file at the Federal Register Library.

§ 160.021-2 Type.

(a) Hand red flare distress signals specified by this subpart shall be of one type which shall consist essentially of a wooden handle to which is attached a tubular casing having a sealing plug at the handle end, the casing being filled with a flare composition and having a button of ignition material at the top, with a removable cap having a friction striking material on its top which may be exposed for use by pulling a tear strip. The flare is ignited by scraping the friction striker on top of the cap against the igniter button on top of the flare. The general arrangement of the flare is shown by Figure No. 160.021-2(a). Alternate arrangements which conform to all the performance requirements of this specification (and other arrangements which conform with all performance requirements except candlepower and burning time, but provide not less than 3,000 candela-minutes with a minimum of ⅓ minute burning time) will be given special consideration.


FRICTION STRIKER
CARDBOARD DISK
CAP
SHOULDER
(IGNITION BUTTON PROTECTOR)
STARTER MIXTURE
(OPTIONAL)
A
IGNITER BUTTON
FLARE COMPOSITION
TEAR
STRIP
TUBULAR CASING
'G'
PLUG
E
A
B
WOODEN
HANDLE
F
C
E
D
SECTIONAL VIEW

DIMENSIONS
(approximate unless
otherwise noted)

A	25 mm (1 in.) minimum
B	235 mm (9.25 in.)
C	125 mm (5 in.)
D	16 mm (0.625 in.)
E	27 mm (1.062 in.)
F	19 mm (0.75 in.)
G	28 mm (1.125 in.)

Figure 160.021-2(a). Hand Red Flare Distress Signal - General Arrangement.

§ 160.021-3 Materials, workmanship, construction and performance requirements.

(a) *Materials.* The materials shall conform strictly to the specifications and drawings submitted by the manufacturer and approved by the Commandant. The color of the tube shall be red. Flare compositions containing sulphur shall not contain more than 2.6 percent of potassium chlorate or an equivalent amount of any other chlorate. Flare compositions containing chlorates in any quantity shall not contain any ammonium salts.

(b) *Workmanship.* Hand red flare distress signals shall be of first class workmanship and shall be free from imperfections of manufacture affecting their appearance or that may affect their serviceability. Moisture-proof coatings shall be applied uniformly and shall be free from pinholes or other visible defects which would impair their usefulness.

(c) *Construction.* The casing shall be fitted and secured to the handle with not less than a 25 mm (1 in.) overlap and shall be attached to the handle in such a manner that failure of the joint will not occur during tests, ignition, or operation. The plug shall be securely affixed in the casing to separate the flare composition from the wooden handle. The flare composition shall be thoroughly mixed and be uniformly compressed throughout to preclude variations of density which may adversely affect uniformity of its burning characteristics. The cap shall have a lap fit of not less than 25 mm (1 in.) over the end of the casing and flare composition to entirely and securely protect the exposed surface of the igniter button and end of flare composition and casing, and shall have an inner shoulder so constructed that it is mechanically impossible for the inner surface of the cap to come in contact with the igniter button. The cap shall be securely attached to the casing in such manner as to preclude its accidental detachment. The cap shall be provided on its top with a friction striking material which shall, by a pull of the tear strip, be entirely exposed for striking the friction igniter button. The igniter button shall be non-water soluble or be protected from moisture by a coating of some waterproof substance, and shall be raised or exposed in such manner as to provide positive ignition by the friction striker. The igniter button shall be firmly secured in or on the top of the flare composition; the arrangement shall be such that the ignition will be transmitted to the flare composition. The assembled flare, consisting of tear strip, cap, casing, and handle, shall be sealed and treated to protect the flare from deterioration by moisture. The protective waterproof coating shall be applied so none adheres to the friction striking surface. Special consideration will be given to alternate waterproofing of the signal by means of a water-resistant coating on the signal plus packaging in a sealed plastic waterproof bag satisfactory to the Commandant.

(d) *Performance.* Signals shall meet all the inspection and test requirements contained in § 160.021-4.

§ 160.021-4 Approval and production tests.

(a) *Approval tests.* The manufacturer must produce a lot of at least 100 signals form which samples must be taken for testing for approval under § 160.021-7. The approval tests are the operational tests and technical tests in paragraphs (c) and (d) of this section. The approval tests must be conducted by an independent laboratory accepted by the Commandant under § 159.010 of this Chapter.

(b) *Production inspections and tests.* Production inspections and tests of each lot of signals produced must be conducted under the procedures in § 159.007 of this Chapter. Signals from a rejected lot must not be represented as meeting this Subpart or as being approved by the Coast Guard. If the manufacturer identifies the cause of the rejection of a lot of signals, the signals in the lot may be reworked by the manufacturer to correct the problem. Samples from the rejected lot must be retested in order to be accepted. Records shall be kept of the reasons for rejection, the reworking performed on the rejected lot, and the results of the second test.

(1) *Lot size.* For the purposes of sampling the production of signals, a lot must consist of not more than

30,000 signals. Lots must be numbered serially by the manufacturer. A new lot must be started with: (i) any change in construction details, (ii) any change in sources of raw materials, or (iii) the start of production on a new production line or on a previously discountinued production line.

(2) *Inspections and tests by the manufacturer.* The manufacturer's quality control procedures must include inspection of materials entering into construction of the signals and inspection of the finished signals, to determine that signals are being produced in accordance with the approved plans. Samples from each lot must be tested in accordance with the operational tests in paragraph (c) of this section.

(3) *Inspections and tests by an independent laboratory.* An independent laboratory accepted by the Commandant under § 159.010 of this Chapter must perform or supervise the inspections and tests under paragraph (b)(2) of this section at least 4 times a year, unless the number of lots produced in year is less than four. The inspections and tests must occur at least once during each quarterly period, unless no lots are produced during that period. If less than four lots are produced, the laboratory must perform or supervise the inspection and testing of each lot. In addition, the laboratory must perform or supervise the technical tests in paragraph (d) of this section at least once for every ten lots of signals produced, except that the number of technical tests must be at least one but not more than four per year. If a lot of signals tested by the independent laboratory is rejected, the laboratory must perform or supervise the inspections and tests of the reworked lot and the next lot of signals produced. The tests of each reworked lot and the next lot produced must not be counted for the purpose of meeting the requirement for the annual number of inspections and tests performed or supervised by the independent laboratory.

(c) *Operational tests.* Each lot of signals must be sampled and tested as follows:

(1) *Sampling procedure and accept/reject criteria.* A sample of signals must be selected at random from the lot. The size of the sample must be the individual sample size in Table 160.021-4(c)(1) corresponding to the lot size. Each signal in the sample is tested as prescribed in the test procedure in paragraph (c)(2) of this section. Each signal that has a defect listed in the table of defects (Table 160.021-4(c)(2)) is assigned a score (failure percent) in accordance with that table. In the case of multiple defects, only the score having the highest numerical value is assigned to that signal. If the sum of all the failure percents (cumulative failure percent) for the number of units in the sample is less than or equal to the accept criterion, the lot is accepted. If the cumulative failure percent falls between the accept and reject criteria, another sample is selected from the production lot and the operational tests are repeated. The cumulative failure percent of each sample tested is added to that of the previous samples to obtain the cumulative failure percent for all the signals tested (cumulative sample size). Additional samples are tested and the tests repeated until either the accept or reject criterion for the cumulative sample size is met. If any signal in the sample explodes when fired or ignited in a way that could burn or otherwise injure the person firing it, the lot is rejected without further testing. (This procedure is diagrammed in figure 160.021-4(c)).

(2) *Test procedure.* Each sample signal (specimen) must be tested as follows:

(i) *Conditioning of test specimens—water resistance.* Immerse specimen horizontally with uppermost portion of the signal approximately 25 mm (1 in.) below the surface of the water for a period of 24 hours. If the signal is protected by alternate waterproofing consisting of a water-resistant coating on the signal plus packaging in a sealed plastic waterproof bag, the 24-hour water immersion conditioning will be conducted while the signal is in the sealed plastic waterproof bag and will be followed by an additional immersion of the bare signal (i.e., after removal from the bag) 25 mm (1 in.) below the surface of the water for a period of 10 minutes.

(ii) *Waterproofing of igniter button.* Remove the cap from the test specimen. Place head of specimen without cap about 25 mm (1 in .) under the surface of water for approximately 5 minutes. Remove specimen from the water and wipe dry.

(iii) *Ignition and burning characteristics.* Test specimens shall ignite and burn satisfactorily with uniform intensity when the directions on the signal are followed. Test specimens shall not ignite explosively in a manner that might be dangerous to the user or persons close by. The plug separating the flare composition from the handle shall in no case allow flame or hot gases to pass through it or between it and the casing in such manner as might burn the hand while holding the signal by the handle.

(iv) *Burning time.* The burning time of a specimen shall be obtained by stop watch measurements from the time a distinct sustained flame is emitted until it ceases. Test specimens shall burn in air not less than 2 minutes.

TABLE 160.021-4(C)(1).—Accept and reject criteria for operational test lots.

Lot size	Individual sample size	Sample	Cumulative sample size	Accept [1]	Reject [1]
280 or less	8	First	8	(2)	400
		Second	16	100	500
		Third	24	200	600
		Fourth	32	300	700
		Fifth	40	500	800
		Sixth	48	700	900
		Seventh	56	950	951
281 to 500	13	First	13	0	400
		Second	26	100	600
		Third	39	300	800
		Fourth	52	500	1,000
		Fifth	65	700	1,100
		Sixth	78	1,000	1,200
		Seventh	91	1,350	1,351
501 to 1,200	20	First	20	0	500
		Second	40	300	800
		Third	60	600	1,000
		Fourth	80	800	1,300
		Fifth	100	1,100	1,500
		Sixth	120	1,400	1,700
		Seventh	140	1,850	1,851
1,201 to 3,200	32	First	32	100	700
		Second	64	400	1,000
		Third	96	800	1,300
		Fourth	128	1,200	1,700
		Fifth	160	1,700	2,000
		Sixth 2	2,100	2,300	
		Seventh	224	2,550	2,551
More than 3,201	50	First	50	200	900
		Second	100	700	1,400
		Third	150	1,300	1,900
		Fourth	200	1,900	2,500
		Fifth	250	2,500	2,900
		Sixth	300	3,100	3,300
		Seventh	350	3,750	3,751

[1] Cumulative failure percent.

[2] Lot may not be accepted. Next sample must be tested.

TABLE 160.021-4(C)(2)

Kind of defects	Percentage of failure
a. Failure to ignite	100
b. Ignites or burns dangerously	50
c. Nonuniform burning intensity	50
d. Chimneys so as to materially obscure the flame	25
e. Fire flashes down between casing and handle so as to endanger burning the hand	50
f. Burning time less than 70 pct of specified time	100
g. Burning time at least 70 pct but less than 80 pct of specified time	75
h. Burning time at least 80 pct but less than 90 pct of specified time	50
i. Burning time at least 90 pct but less than 100 pct of specified time	25

(d) *Technical tests.* Three signals must be subjected to each of the following tests. Two of the three signals must pass each test in order for the lot of signals to be accepted.

(1) *Underwater burning.* Condition each sample in accordance with paragraph (c)(2)(i) of this section. Ignite specimen and let it burn about 5 seconds in air. Submerge the burning signal in water in a vertical position with head down. Obtain under water burning time by stop watch measurement from time of submersion until distinct, sustained flame emission ceases. The test specimen shall burn under water not less than 5 seconds when subjected to this test.

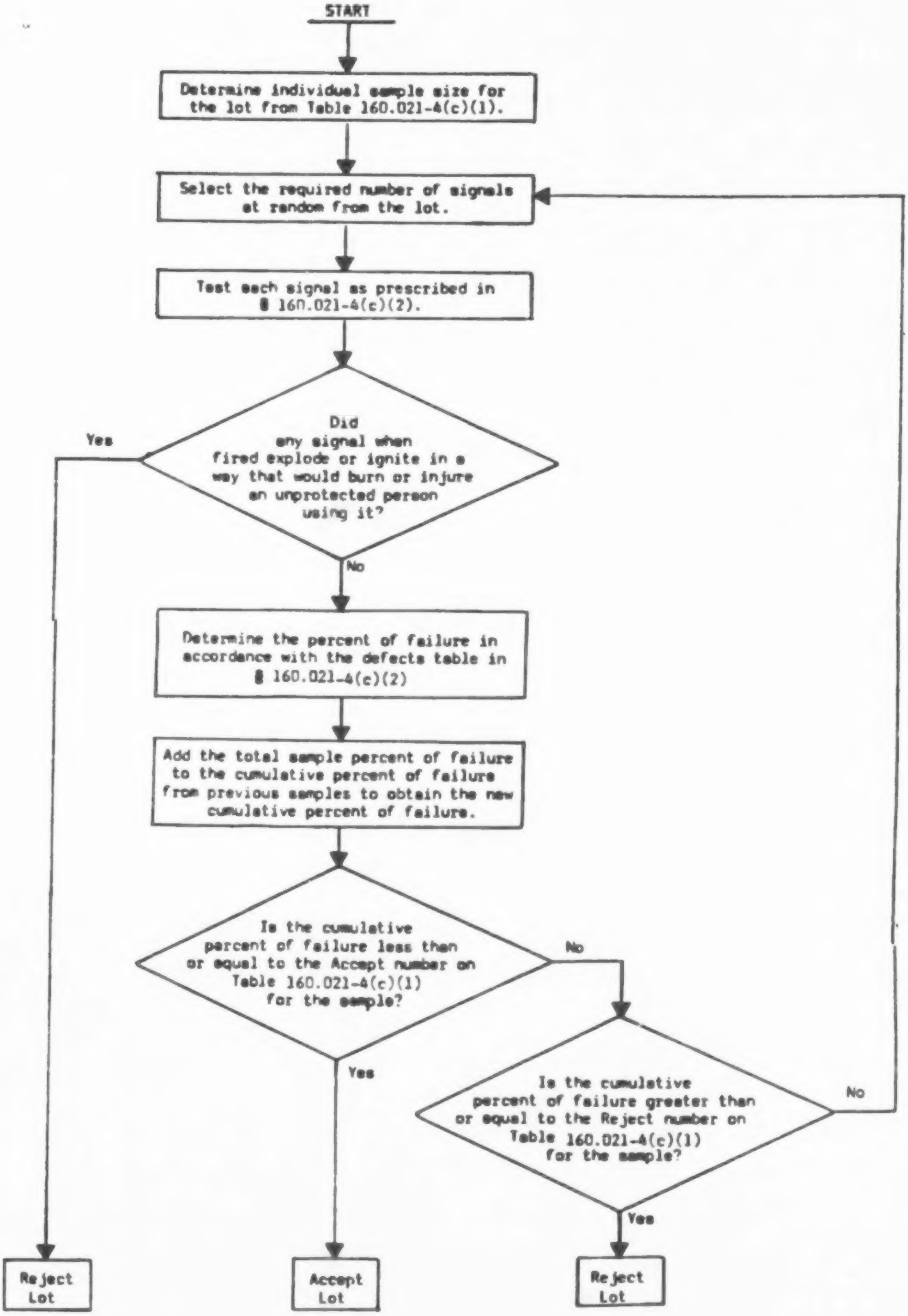

START
Determine individual sample size for the lot from Table 160.021-4(c)(1).
Select the required number of signals at random from the lot.
Test each signal as prescribed in § 160.021-4(c)(2).
Did any signal when fired explode or ignite in a way that would burn or injure an unprotected person using it?
Yes
No
Determine the percent of failure in accordance with the defects table in § 160.021-4(c)(2)
Add the total sample percent of failure to the cumulative percent of failure from previous samples to obtain the new cumulative percent of failure.
Is the cumulative percent of failure less than or equal to the Accept number on Table 160.021-4(c)(1) for the sample?
No
Yes
Is the cumulative percent of failure greater than or equal to the Reject number on Table 160.021-4(c)(1) for the sample?
No
Yes
Reject Lot
Accept Lot
Reject Lot

Figure 160.021-4(c). Operational test procedure.

(2) *Bending strength.* Place the specimen on supports 15 cm (6 in.) apart. Attach a weight of 35 kg (77 lb.) to a length of wire. Hang the weight from the supported signal by looping the wire around the signal approximately equidistant from the two points of support. Let the weight hang approximately 5 minutes. The test specimen shall not deflect more than 7 mm (1/4 in.), nor shall the joint between the casing and the handle fail, when subjected to this test.

(3) *Tensile strength.* Place the specimen in a chuck firmly holding it about 13 mm (1/2 in.) below the cap. Attach a weight of 35 kg (77 lb.) to a length of wire. Hang the weight from the supported signal by looping the wire through a hole bored perpendicular to and through the axis of the handle. Let the weight hang approximately 5 minutes. The test specimen shall not show noticeable distortion, nor shall the joint between the casing and handle fail, when subjected to this test.

(4) *Luminous intensity.* The luminous intensity of each specimen tested shall be measured by a visual photometer or equivalent photometric device, while the specimen is supported in a horizontal position and the photometer is at right angles to the axis of the specimen. Visual luminous intensity readings shall be observed and recorded at approximately 20 second intervals during the burning of the specimen. The minimum photometric distance shall be 3 m (10 ft.). Recording photometers shall have a chart speed of at least 25 mm (1 in.) per minute. The luminous intensity of specimen shall be computed as the arithmetical average of the readings recorded. The average luminous intensity of a test specimen shall be not less than 500 candela. The burning time of a specimen shall be obtained by stop watch measurements from the time distinct, sustained flame is emitted until it ceases. Test specimens shall burn in air not less than 2 minutes.

(5) *Elevated temperature, humidity and storage.* Place specimen in a thermostatically controlled even-temperature oven held at 75°C. with not less than 90 percent relative humidity for 72 hours. Remove specimen and store at room temperature (20° to 25°C.) with approximately 65 percent relative humidity for 10 days. If for any reason it is not possible to operate the oven continuously for the 72-hour period, it may be operated at the required temperature and humidity for 8 hours out of each 24 during the 72-hour conditioning period. (Total of 24 hours on and 48 hours off.) The signal shall not ignite or decompose during this conditioning. The signal shall ignite and operate satisfactorily following this conditioning.

(6) *Spontaneous ignition.* Place the specimen in a thermostatically controlled even-temperature oven held at 75°C. with not more than 10% relative humidity for 48 consecutive hours. The signals shall not ignite or undergo marked decomposition.

(7) *Chromaticity.* The color of the burning signal must be vivid red as defined by Sections 13 and 14 of the "Color Names Dictionary." Two identical test plates of white cardboard about 30 cm x 60 cm (12" x 24") are used. Except for a negligible amount of stray daylight, the first test plate is illuminated by light from the specimen placed at a distance of about 1.5 m (5 ft.). The second test plate is illuminated only by light from an incandescent lamp operated at a color temperature close to 2,848°K at a distance of about 30 cm (1 ft.). The first plate is viewed directly, the second through combinations of Lovibond red, yellow, and blue glasses selected so as to approximate a chromaticity match. By separating the test plates by a wide unilluminated area (subtending at the observer about 45°), it is possible to make accurate determinations of chromaticity in terms of the 1931 CIE Standard Observer and Coordinate System, in spite of fluctuations in luminous intensity of the specimen by factors as high as 2 or 3. The CIE coordinates are converted to the Munsell notation which is cross-referenced to the color name in Section 13 of the "Color Names Dictionary" (see the discussion in Section 10 of "The Universal Color Language").

(8) *Heptane ignition.* (i) A metal pan must be used to hold a layer of water at least 12mm (½ in.) deep with a layer of technical grade heptane on

top of the water. The pan must be at least 1 m (39 in.) square with sides extending between 175mm (7 in.) and 200 mm (8 in.) above the surface of the water. The amount of heptane used to form the layer must be 2.0 liters per square meter of pan area (6.25 fluid ounces per square foot).

(ii) The test must be conducted in a draft-free location. The ambient temperature, the temperature of the water, and the temperature of the heptane must all be between 20° C (68° F) and 25° C (77° F) at the time of the test.

(iii) The signal under test must be held with the flame end pointing upward at an angle of approximately 45°, 1.2 m (4 ft.) directly above the center of the pan. The signal must be ignited as soon as the heptane is observed to spread out over the water in continuous layer. The signal must be allowed to burn completely, and must remain in position until is has cooled.

(iv) The heptane must not be ignited by the flare or by material from the flare.

Caution: Heptane ignites rapidly and burns vigorously. The flare should be remotely ignited and all personnel should stay clear of the test pan while the flare is burning and while any part of it remains hot.

[CGD 76-048a and 76-048b, 44 FR 73060, Dec. 17, 1979, as amended by CGD 80-021, 45 FR 45280, July 3, 1980]

§ 160.021-5 Labeling and marking.

(a) *Labeling.* Each hand red flare distress signal shall bear a label securely affixed thereto, showing in clear, indelible black lettering on a red background, the following wording and information:

(Company brand or style designation)

Hand Red Flare Distress Signal

500 Candela—2 Minutes Burning Time

Use Only When Aircraft or Vessel
Is Sighted

Directions—Pull tape over top of cap. Remove cap and ignite flare by rubbing scratch surface on top of cap sharply across igniter button on head of signal.

Caution—Stand with back to wind and point away from body when igniting or flare is burning.

Service Life Expiration Date (Month and year to be inserted by manufacturer) (Month and year manufactured) (Lot No.——). Manufactured by (Name and address of manufacturer). U.S. Coast Guard Approval No.——

(b) *Marking of expiration date.* The expiration date must be not more than 42 months from the date of manufacture.

(c) *Other marking.* (1) There shall be die-stamped, in the side of the wooden handle in figures not less than 3 mm (C⅛ in.) high, numbers indicating the month and year of manufacture, thus: "6-54" indicating June, 1954.

(2) In addition to any other marking placed on the smallest packing carton or box containing hand red flare distress signals, such cartons or boxes shall be plainly and permanently marked to show the service life expiration date, date of manufacture, and lot number.

(3) The largest carton or box in which the manufacturer ships signals must be marked with the following or equivalent words: "Keep under cover in a dry place."

Note: Compliance with the labeling requirements of this section does not relieve the manufacturer of the responsibility of complying with the label requirements of 15 USC 1263, the Federal Hazardous Substances Act.

§ 160.021-6 Container.

(a) *General.* Containers for stowage of hand red flare distress signals in lifeboats and life rafts on merchant vessels are not required to have specific approval or to be of special design, but they shall meet the following test for watertightness when closed, and shall be capable of being opened and reclosed hand-tight to meet the same watertightness test. The materials shall be copper, brass, bronze, or equally corrosion-resistant to salt water and spray. The type container illustrated by Figure Number 160.021-6(a) is recommended for most purposes.

(b) *Watertightness test for containers.* Whenever a question arises as to the watertightness of a container, the following test may be made to determine whether it is satisfactory in this respect. Open the container, remove the contents, insert colored blotting paper as a lining, re-close container as tightly as possible by hand (no wrenches or special tools permitted), submerge container with top about 30 cm (1 ft.) below the surface of the water for two hours, remove container from water, wipe off excess moisture on outside, then open the container and examine the blotting paper and entire interior for evidence of moisture penetration. If any moisture or water is evidenced, the container is not satisfactory.

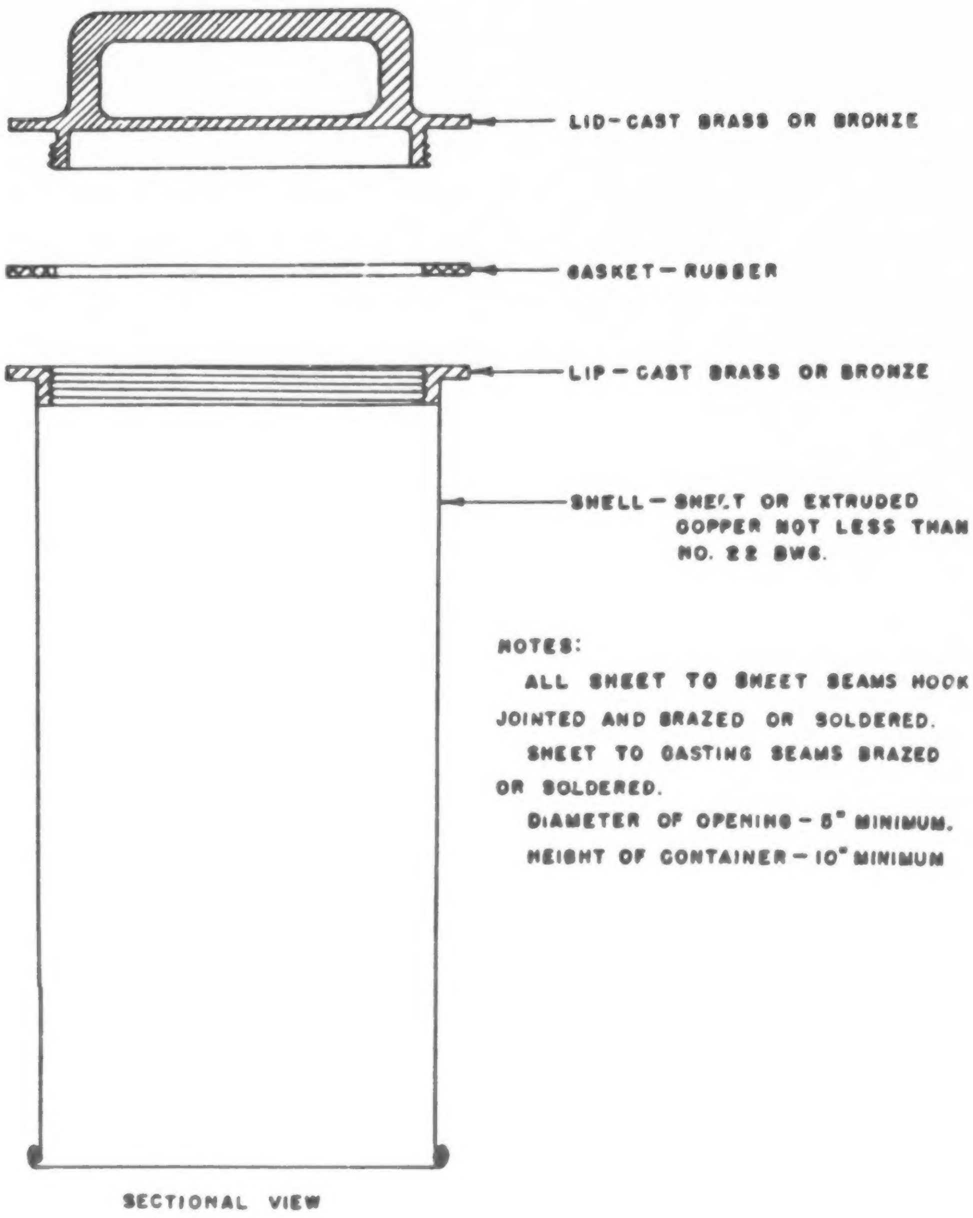

LID-CAST BRASS OR BRONZE
GASKET-RUBBER
LIP-CAST BRASS OR BRONZE
SHELL-SHEET OR EXTRUDED COPPER NOT LESS THAN NO. 22 BWG.
NOTES:
ALL SHEET TO SHEET SEAMS HOOK JOINTED AND BRAZED OR SOLDERED.
SHEET TO CASTING SEAMS BRAZED OR SOLDERED.
DIAMETER OF OPENING - 5" MINIMUM.
HEIGHT OF CONTAINER - 10" MINIMUM
SECTIONAL VIEW

Figure 160.021-6(a). Watertight Container for Hand Red Flare Distress Signals.

(c) *Marking of container.* Containers shall be embossed or bear a brass or equivalent corrosion-resistant nameplate, or otherwise be suitably and permanently marked, to plainly show in letters not less than 13 mm (½ in.) high the following wording: "HAND RED FLARE DISTRESS SIGNALS". No additional marking which might cause confusion as to the contents shall be permitted. The vessel's name ordinarily is painted or branded on equipment such as this container, and nothing in this subpart shall be construed as prohibiting same.

§ 160.021-7 Procedure for approval.

(a) Signals are approved by the Coast Guard under the procedures in Subpart 159.005 of this Chapter.

§ 160.021-9 Recognized independent laboratories.

(a) The following independent laboratories have been accepted by the Commandant for conducting the approval and production tests required in this Subpart:

(1) (Reserved).

(b) Revised copies of this list may be obtained from Commandant (G-MMT-3/TP12), U.S. Coast Guard Headquarters, Washington, D.C. 20593.

Subpart 160.022—Floating Orange Smoke Distress Signals (5 Minutes)

AUTHORITY: 46 U.S.C. 481, 49 U.S.C. 1655(b)(1), 49 CFR 1.46(b).

SOURCE: CGD 76-048a and 76-048b, 44 FR 73067, Dec. 17, 1979, unless otherwise noted.

§ 160.022-1 Incorporations by reference.

(a) The following are incorporated by reference into this subpart:

(1) "The Color Names Dictionary" in *Color: Universal Language and Dictionary of Names*, National Bureau of Standards Special Publication 440, December 1976.

(2) "Development of a Laboratory Test for Evaluation of the Effectiveness of Smoke Signals," National Bureau of Standards Report 4792, July 1956.

(b) NBS Special Publication 440 may be obtained by ordering from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 (Order by SD Catalog No. C13.10:440).

(c) NBS Report 4792 may be obtained from the Commandant (G-MMT-3/TP12), U.S. Coast Guard, Washington, D.C. 20593.

(d) Approval to incorporate by reference the materials listed in this section was obtained from the Director of the Federal Register on November 1 and 29, 1979. The materials are on file in the Federal Register Library.

§ 160.022-2 Type.

(a) Floating orange smoke distress signals, specified by this subpart shall be of one type which shall consist essentially of an outer container, ballast, an air chamber, an inner container, the smoke producing composition, and an igniter mechanism. Alternate arrangements which conform to the performance requirements of this specification will be given special consideration.

§ 160.022-3 Materials, workmanship, construction, and performance requirements.

(a) *Materials.* The materials shall conform strictly to the specifications and drawings submitted by the manufacturer and approved by the Commandant. Metal for containers shall be not less than 0.5 mm (0.020 in.) in thickness. Other dimensions or materials may be considered upon special request when presented with supporting data. Igniter systems shall be corrosion-resistant metal. The combustible material shall be of such nature that it will not deteriorate during long storage, nor when subjected to frigid or tropical climates, or both.

(b) *Workmanship.* Floating orange smoke distress signals shall be of first class workmanship and shall be free from imperfections of manufacture affecting their appearance or that may affect their serviceability.

(c) *Construction.* The outer container shall be of a size suitable for its intended use. All sheet metal seams should be hook-jointed and soldered. The whole container shall be covered with two coats of waterproof paint or equivalent protection system. The igniter mechanism shall be simple to operate and provide ignition in most unfavorable weather. The mechanism shall be protected with a watertight cover having a finish which is corrosion-resistant to salt water and spray. The cover shall be easily and quickly removable by hand without the use of tools. If attachment of the cover is by formed screw threads, it shall be of such construction or material to prevent rusting or corrosion and will not back off and loosen under shipboard vibration.

(d) *Performance.* Signals shall meet all the inspection and test requirements contained in § 160.022-4.

§ 160.022-4 Approval and production tests.

(a) *Approval tests.* The manufacturer must produce a lot of at least 100 signals from which samples must be taken for testing for approval under § 160.022-7. The approval tests are the operational tests and technical tests in paragraphs (c) and (d) of this section. The approval tests must be conducted by an independent laboratory accepted by the Commandant under § 159.010 of this Chapter.

(b) *Production inspections and tests.* Production inspections and tests of each lot of signals produced must be conducted under the procedures in § 159.007 of this Chapter. Signals from a rejected lot must not be represented as meeting this Subpart or as being approved by the Coast Guard. If the manufacturer identifies the cause of the rejection of a lot of signals, the signals in the lot may be reworked by the manufacturer to correct the problem. Samples from the rejected lot must be retested in order to be accepted. Records shall be kept of the reasons for rejection, the reworking performed on the rejected lot, and the results of the second test.

(1) *Lot size.* For the purposes of sampling the production of signals, a lot must consist of not more than 30,000 signals. Lots must be numbered serially by the manufacturer. A new lot must be started with:

(i) Any change in construction details,

(ii) Any change in sources of raw materials, or

(iii) The start of production on a new production line or on a previously discontinued production line.

(2) *Inspections and tests by the manufacturer.* The manufacturer's quality control procedures must include inspection of materials entering into construction of the signals and inspection of the finished signals, to determine that signals are being produced in accordance with the approved plans. Samples from each lot must be tested in accordance with the operational tests in paragraph (c) of this section.

(3) *Inspections and tests by an independent laboratory.* An independent laboratory accepted by the Commandant under § 159.010 of this Chapter must perform or supervise the inspections and tests under paragraph (b)(2) of this section at least 4 times a year, unless the number of lots produced in a year is less than four. The inspections and tests must occur at least once during each quarterly period, unless no lots are produced during that period. If less than four lots are produced, the laboratory must perform or supervise the inspection and testing of each lot. In addition, the laboratory must perform or supervise the technical tests in paragraph (d) of this section at least once for every ten lots of signals produced, except that the number of technical tests must be at least one but not more than four per year. If a lot of signals tested by the independent laboratory is rejected, the laboratory must perform or supervise the inspections and tests of the reworked lot and the next lot of signals produced. The tests of each reworked lot and the next lot of signals must not be counted for the purpose of meeting the requirement for the annual number of inspections and tests performed or supervised by the independent laboratory.

(c) *Operational tests.* Each lot of signals must be sampled and tested as follows:

(1) *Sampling procedure and accept/reject criteria.* A sample of signals must be selected at random from the lot. The size of the sample must be the individual sample size in Table 160.022-4(c)(1) corresponding to the lot size. Each signal in the sample is

tested as prescribed in the test procedure in paragraph (c)(2) of this section. Each signal that has a defect listed in the table of defects (Table 160.022-4(c)(2)) is assigned a score (failure percent) in accordance with that table. In the case of multiple defects, only the score having the highest numerical value is assigned to that signal. If the sum of all the failure percents (cumulative failure percent) for the number of units in the sample is less than or equal to the accept criterion, the lot is accepted. If this sum is equal to or more than the reject criterion the lot is rejected. If the cumulative failure percent falls between the accept and reject criteria, another sample is selected from the production lot and the operational tests are repeated. The cumulative failure percent of each sample tested is added to that of the previous samples to obtain the cumulative failure percent for all the signals tested (cumulative sample size). Additional samples are tested and the tests repeated until either the accept or reject criterion for the cumulative sample size is met. If any signal in the sample explodes when fired or ignited in a way that could burn or otherwise injure the person firing it, the lot is rejected without further testing. (This procedure is diagrammed in figure 160.022-4(c).)

(2) *Test Procedure.* Each sample signal (specimen) must be tested as follows:

(i) *Conditioning of test specimens—water-resistance.* Immerse specimens horizontally with uppermost portion of the signal approximately 25 mm (1 in.) below the surface of the water for a period of 24 hours.

(ii) *Smoke emitting time.* Ignite specimen according to the directions printed on the signal and place signal in tub or barrel of water. The smoke emitting time of a specimen shall be obtained by stop watch measurements from the time of distinct, sustained smoke emission until it ceases. The watch shall be stopped during periods of flame emission. The smoke emitting time for a specimen shall be not less than 4 minutes.

(iii) *Ignition and smoke emitting characteristics.* Test specimens shall ignite and emit smoke properly when the directions on the signal are followed. Test specimens shall not ignite explosively in a manner that might be dangerous to the user or persons close by. Test specimens shall emit smoke at a uniform rate while floating in calm to rough water. Signals should be so constructed that water submerging the signal in moderately heavy seas will not cause it to become inoperative.

TABLE 160.022-4(c)(1).—Accept and reject criteria for operational test lots.

Lot size	Individual sample size	Sample	Cumulative sample size	Accept [1]	Reject [1]
280 or less	8	First	8	([2])	400
		Second	16	100	500
		Third	24	200	600
		Fourth	32	300	700
		Fifth	40	500	800
		Sixth	48	700	900
		Seventh	56	950	951
281 to 500	13	First	13	0	400
		Second	26	100	600
		Third	39	300	800
		Fourth	52	500	1,000
		Fifth	65	700	1,100
		Sixth	78	1,000	1,200
		Seventh	91	1,350	1,351
501 to 1,200	20	First	20	0	500
		Second	40	300	800
		Third	60	600	1,000
		Fourth	80	800	1,300
		Fifth	100	1,100	1,500
		Sixth	120	1,400	1,700
		Seventh	140	1,850	1,851

Table 160.022-4(c)(1).—Accept and reject criteria for operational test lots.—Continued

Lot size	Individual sample size	Sample	Cumulative sample size	Accept [1]	Reject [1]
1,201 to 3,200	32	First	32	100	700
		Second	64	400	1,000
		Third	96	800	1,300
		Fourth	128	1,200	1,700
		Fifth	160	1,700	2,000
		Sixth 2	2,100	2,300	
		Seventh	224	2,550	2,551
More than 3,201	50	First	50	200	900
		Second	100	700	1,400
		Third	150	1,300	1,900
		Fourth	200	1,900	2,500
		Fifth	250	2,500	2,900
		Sixth	300	3,100	3,300
		Seventh	350	3,750	3,751

[1] Cumulative failure percent.

[2] Lot may not be accepted. Next sample must be tested.

Table 160.022-4(c)(2)

Kind of defects	Percentage of failure
a. Failure to ignite	100
b. Ignites or burns dangerously	50
c. Nonuniform smoke emitting rate	50

Table 160.022-4(c)(2)—Continued

Kind of defects	Percentage of failure
d. Smoke-emitting time less than 70 pct of specified time	100
e. Smoke-emitting time at least 70 pct but less than 30 pct of specified time	75
f. Smoke-emitting time at least 80 pct but less than 90 pct of specified time	50
g. Smoke-emitting time at least 90 pct but less than 100 pct of specified time	25

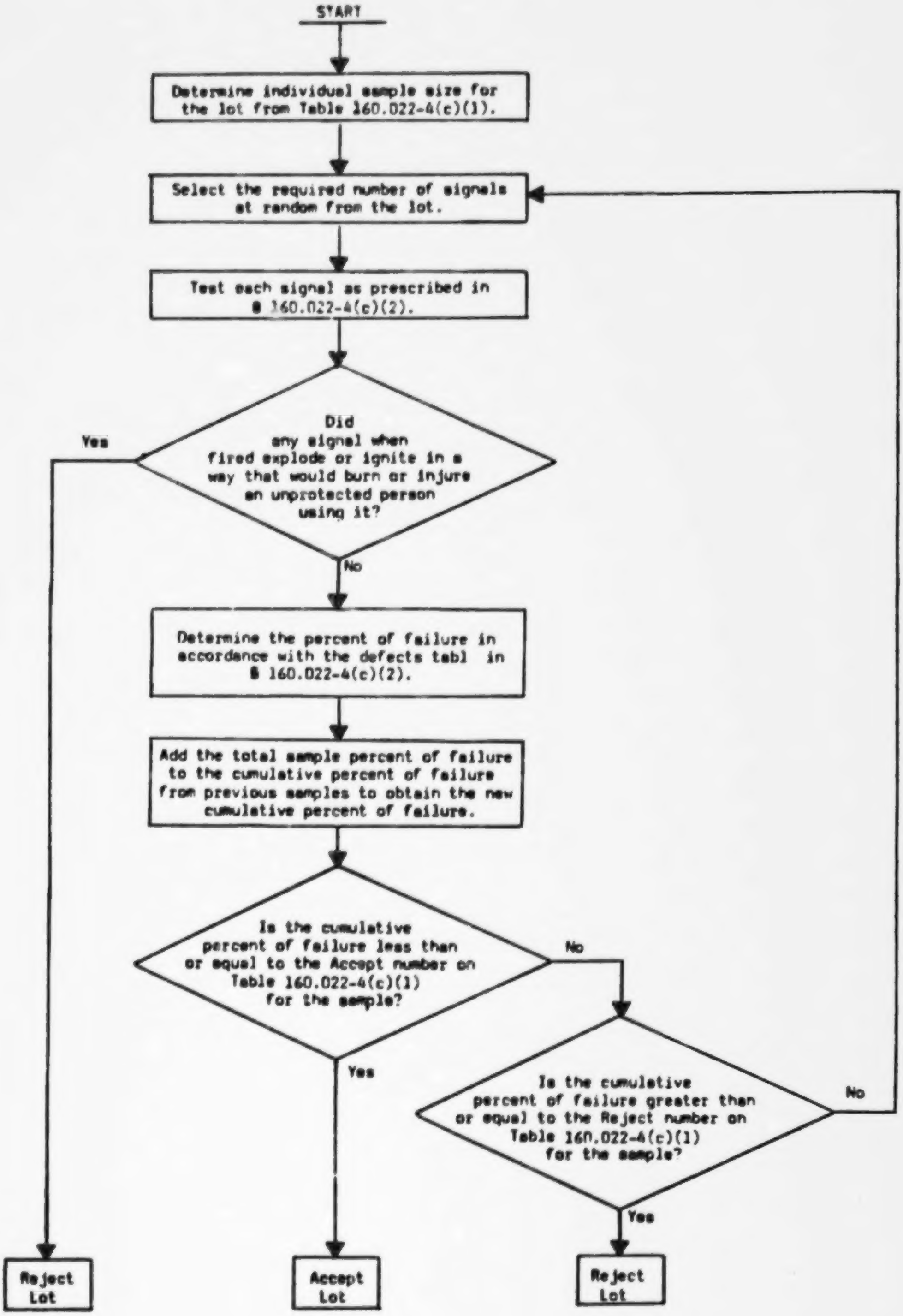

START
Determine individual sample size for the lot from Table 160.022-4(c)(1).
Select the required number of signals at random from the lot.
Test each signal as prescribed in § 160.022-4(c)(2).
Did any signal when fired explode or ignite in a way that would burn or injure an unprotected person using it?
Yes
No
Determine the percent of failure in accordance with the defects tabl in § 160.022-4(c)(2).
Add the total sample percent of failure to the cumulative percent of failure from previous samples to obtain the new cumulative percent of failure.
Is the cumulative percent of failure less than or equal to the Accept number on Table 160.022-4(c)(1) for the sample?
No
Yes
Is the cumulative percent of failure greater than or equal to the Reject number on Table 160.022-4(c)(1) for the sample?
No
Yes
Reject Lot
Accept Lot
Reject Lot

Figure 160.022-4(c). Operational test procedure.

(d) *Technical tests.* Three signals must be subjected to each of the following tests. Two of the three signals must pass the test in order for the lot of signals to be accepted.

(1) *Smoke emission in waves.* The signal shall be ignited and thrown overboard under conditions where the waves are at least 30 cm (1 ft.) high. The smoke emitting time must be at least 4 minutes and the signal shall float in such a manner that the signal shall function properly during this test. Failure to pass this test shall be cause for the lot to be rejected.

(2) *Underwater smoke emission.* Condition each sample in accordance with paragraph (c)(2)(i) of this section. Ignite specimen and let it burn about 15 seconds in air. Submerge the burning signal in water in a vertical position with head down. Obtain underwater smoke emission time by stop watch measurements from time of submersion until distinct, sustained smoke emission ceases. The test specimen shall emit smoke underwater not less than 15 seconds when subjected to this test.

(3) *Elevated temperature, humidity, and storage.* Place specimen in a thermostatically controlled even-temperature oven held at 75° C. with not less than 90 percent relative humidity for 72 hours. Remove specimen and store at room temperature (20° to 25° C.) with approximately 65 percent relative humidity for ten days. If for any reason it is not possible to operate the oven continuously for the 72-hour period, it may be operated at the required temperature and humidity for 8 hours out of each 24 during 72-hour conditioning period. (Total of 24 hours on and 48 hours off). The signal shall not ignite or decompose during this conditioning. The signal shall ignite and operate satisfactorily following this conditioning.

(4) *Spontaneous ignition.* Place the specimen in a thermostatically controlled even-temperature oven held at 75° C. with not more than 10% relative humidity for 48 consecutive hours. The signal shall not ignite or undergo marked decomposition.

(5) *Susceptibility to explosion.* Remove smoke composition from signal and punch a small hole in the composition. Insert a No. 6 commercial blasting cap. Ignite the cap. The test specimen shall not explode or ignite.

(6) *Corrosion resistance.* Expose the complete specimen with cover secured hand-tight to a finely divided spray of 20 percent by weight sodium chloride solution at a temperature between 32° C and 38° C (90° F and 100° F) for 100 hours. The container and cap must not be corroded in any fashion that would impair their proper functioning.

(7) *Color of smoke.* Ignite specimen in the open air in daytime according to the directions printed on the signal, and determine the smoke color by direct visual comparison of the unshadowed portions of the smoke with a color chart held so as to receive the same daylight illumination as the unshadowed portions of the smoke. The color of the smoke must be orange as defined by Sections 13 and 14 of the "Color Names Dictionary" (colors 34-39 and 48-54).

(8) *Volume and density of smoke.* The test specimen shall show less than 20 percent transmission for not less than 3 minutes when measured with apparatus having a light path of 19 cm (7½ in.), an optical system aperture of +3.7 degrees, and an entrance air flow of 18.4m^3 per minute (650 cu. ft. per minute), such apparatus to be as described in National Bureau of Standards Report No. 4792.

§ 160.022-5 Marking.

(a) *Directions for use.* Each floating orange smoke distress signal shall be plainly and indelibly marked in black lettering not less than 3 mm (⅛ in.) high "Approved for daytime use only", and in black lettering not less than 5 mm (3/16 in.) high with the word "Directions". Immediately below shall be similarly marked in black lettering not less than 3 mm (⅛ in.) high: "1. Use Only When Aircraft or Vessel Is Sighted". Then in numbered paragraphs, in similar lettering, there shall follow in simply and easily understood wording, instructions to be followed to make the device operative. Pasted-on labels are not acceptable.

(b) *Other markings.*

(1) There shall be embossed or die-stamped, in the outer container in fig-

ures not less than 5 mm ($^3/_{16}$ in.) high, numbers, indicating the month and year of manufacture, thus: "6-54" indicating June 1954. The outer container shall also be plainly and indelibly marked with the commercial desination of the signal, the words "Floating Orange Smoke Distress Signal", name and address of the manufacturer, the Coast Guard Approval No., the service life expiration date (month and year to be entered by the manufacturer), the month and year of manufacture and the lot number.

(2) In addition to any other marking placed on the smallest packing carton or box containing floating orange smoke distress signals, such cartons or boxes shall be plainly and indelibly marked to show the service life expiration date, the month and year of manufacture, and the lot number.

(3) The largest carton or box in which the manufacturer ships signals must be marked with the following or equivalent words: "Keep under cover in a dry place."

(c) *Marking of expiration date.* The expiration date must be not more than 42 months from the date of manufacture.

NOTE: Compliance with the labeling requirements of this section does not relieve the manufacturer of the responsibility of complying with the label requirements of 15 U.S.C. 1263, the Federal Hazardous Substances Act.

§ 160.022-7 Procedure for approval.

(a) Signals are approved by the Coast Guard under the procedures in Subpart 159.005 of this Chapter.

§ 160.022-9 Recognized independent laboratories.

(a) The following independent laboratories have been accepted by the Commandant for conducting the approval and production tests required in this Subpart:

(b) Revised copies of this list may be obtained from Commandant (G-MMT-3/TP12), U.S. Coast Guard Headquarters, Washington, D.C. 20593.

Subpart 160.023—Hand Combination Flare and Smoke Distress Signals

AUTHORITY: 46 U.S.C. 481, 49 U.S.C. 1655(b)(1), 49 CFR 1.46(b).

SOURCE: CGD 76-048a and 76-048b, 44 FR 73070, Dec. 17, 1979, unless otherwise noted.

§ 160.023-1 Incorporations by reference.

(a) The following are incorporated by reference into this subpart:

(1) Military specifications MIL-S-18655 C, 3 May 1971—Signal, Smoke and Illumination, Marine, Mark 13, Mod 0.

(b) The military specification may be obtained from Customer Service, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA. 19120 (tel: (215)697-2000). This specification is also on file in the FEDERAL REGISTER library.

(c) Approval to incorporate by reference the materials listed in this section was obtained from the Director of the Federal Register on November 1, 1979.

§ 160.023-2 Type.

(a) Hand combination flare and smoke distress signals specified by this subpart shall be of the type described in specification MIL-S-18655.

§ 160.023-3 Materials, workmanship, construction, and performance requirements.

(a) The materials, construction, workmanship, general and detail requirements shall conform to the requirements of specification MIL-S-18655, except as otherwise specifically provided by this subpart.

§ 160.023-4 Approval and production tests.

(a) *Approval tests.* The approval tests are those tests prescribed for the preproduction sample in MIL-S-18655. The approval tests must be conducted by an independent laboratory accepted by the Commandant under § 159.010 of this Chapter.

(b) *Production inspections and tests.* Production inspections and tests of each lot of signals produced must be conducted under the procedures in § 159.007 of this Chapter. Signals from a rejected lot must not be represented as meeting this Subpart or as being approved by the Coast Guard. If the manufacturer identifies the cause of the rejection of a lot of signals, the signals in the lot may be reworked by the manufacturer to correct the problem. Samples from the rejected lot must be retested in order to be accepted. Records shall be kept of the reasons for rejection, the reworking performed on the rejected lot, and the results of the second test.

(1) *Inspections and tests by the manufacturer.* The manufacturer's quality control procedures must include inspection of materials entering into construction of the signals and inspection of the finished signals, to determine that signals are being produced in accordance with the approved plans. The manufacturer must select samples from each lot and test them as specified in the production lot procedures in MIL-S-18655.

(2) *Inspections and tests by an independent laboratory.* An independent laboratory accepted by the Commandant under § 159.010 of this Chapter must perform or supervise the inspections and tests under paragraph (b)(1) of this section at least 4 times a year, unless the number of lots is less than four. The inspections and tests must occur at least once during each quarterly period, unless no lots are produced during this period. If less than four lots are produced, the laboratory must perform or supervise the inspection and testing of each lot. If a lot of signals tested by the independent laboratory is rejected, the laboratory must perform or supervise the inspections and tests of the reworked lot and the next lot of signals produced. The tests of each reworked lot and the next lot produced must not be counted for the purpose of meeting the requirement for the annual number of inspections and tests performed or supervised by the independent laboratory.

§ 160.023-5 Labeling and marking.

(a) *Labeling.* A label showing firing instructions in accordance with specification MIL-S-18655, and to include the commercial designation of the signal, the lot number, Coast Guard approval number, the service life expiration date (month and year to be inserted by the manufacturer), and month and year of manufacture, shall be applied in a neat, workmanlike manner after the paint has become thoroughly dry. The label shall be attached to the signal and then protected by a transparent moisture impervious coating.

(b) *Marking of expiration date.* The expiration date must be not more than 42 months from the date of manufacture.

(c) *Other marking.*

(1) In addition to any other marking placed on the smallest packing carton or box containing signals, such cartons or boxes shall be plainly and indelibly marked to show the service life expiration date, the date of manufacture, and the lot number.

(2) The largest carton or box in which the manufacturer ships signals must be marked with the following or equivalent words: "Keep under cover in a dry place."

NOTE: Compliance with the labeling requirements of this section does not relieve the manufacturer of the responsibility of complying with the label requirements of 15 U.S.C. 1263, the Federal Hazardous Substances Act.

§ 160.023-6 Container.

(a) *General.* The container for storing the signals on lifeboats and liferafts is not required to be of a special design or be approved by the Coast Guard. The container must meet the requirements in Subpart 160.021 (§ 160.021-6) except that the wording on the container must be: "HAND COMBINATION FLARE AND SMOKE DISTRESS SIGNALS."

§ 160.023-7 Procedure for approval.

(a) Signals are approved by the Coast Guard under the procedures in Subpart 159.005 of this Chapter.

§ 160.023-9 Recognized independent laboratories.

(a) The following independent laboratories have been accepted by the Commandant for conducting the approval and production tests required in this Subpart:

(1) (Reserved).

(b) Revised copies of this list may be obtained from Commandant (G-MMT-3/TP12), U.S. Coast Guard Headquarters, Washington, D.C. 20593.

Subpart 160.024—Pistol-Projected Parachute Red Flare Distress Signals

AUTHORITY: 46 U.S.C. 481, 49 U.S.C. 1655(b)(1), 49 CFR 1.46(b).

SOURCE: CGD 76-048a and 76-048b, 44 FR 73071, Dec. 17, 1979, unless otherwise noted.

§ 160.024-1 Incorporations by reference.

(a) The following is incorporated by reference into this subpart:

(1) "The Universal Color Language" and "The Color Names Dictionary" in *Color: Universal Language and Dictionary of Names*, National Bureau of Standards Special Publication 440, Dictionary 1976.

(b) NBS Special Publication 440 may be obtained by ordering from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 (Order by SD Catalog No. C13.10:440).

(c) Approval to incorporate by reference the publication listed in this section was obtained from the Director of the Federal Register on November 1, 1979. The publication is on file at the Federal Register Library.

§ 160.024-2 Type.

(a) Pistol-projected parachute red flare distress signals specified by this subpart shall be of one type which shall consist essentially of a cartridge having centered primer, propelling charge, and projectile consisting of a case, delay element, expelling charge, and pyrotechnic candle attached to a parachute by shroud lines; the cartridge to be of such dimensions that it can be fitted into and fired from a signal pistol with chamber and bore dimensions within the limits provided by Figure 160.028-2(a) of Subpart 160.028 of this Chapter.

§ 160.024-3 Materials, workmanship, construction, and performance requirements.

(a) *Materials.* The materials used in pistol-projected parachute red flare distress signals shall conform strictly to the specifications and drawings submitted by the manufacturer and approved by the Commandant. In general, all metallic parts shall be corrosion-resistant or properly protected against corrosion.

(b) *Workmanship.* Pistol-projected parachute red flare distress signals shall be of first class workmanship and shall be free from imperfections of manufacture affecting their appearance or that may affect their serviceability.

(c) *Construction.* The exterior case of the cartridge shall be made of suitable metal and shall protect against the entrance of moisture. The projectile case and delay element shall be so constructed as to prevent any possibility of the propelling charge blowing by and causing premature ejection of the projectile contents. The shoulder of the base of the cartridge shall be between 2.29 mm (0.090 in.) and 2.67 mm (0.015 in.) in thickness. The centered primer shall be set below the surface of the base between 0.25 mm (0.010 in.) and 0.50 mm (0.020 in.).

(d) *Performance.* Signals shall meet all of the inspection and test requirements contained in § 160.024-4.

§ 160.024-4 Approval and production tests.

(a) *Approval tests.* The manufacturer must produce a lot of at least 100 signals from which samples must be taken for testing for approval under § 160.024-7. The approval tests are the operational tests and technical tests in paragraphs (c) and (d) of this section. The approval tests must be conducted by an independent laboratory accepted by the Commandant under § 159.010 of this Chapter.

(b) *Production inspections and tests.* Production inspections and tests of each lot of signals produced must be conducted under the procedures in § 159.007 of this Chapter. Signals from a rejected lot must not be represented as meeting this Subpart or as being approved by the Coast Guard. If the manufacturer identifies the cause of the rejection of a lot of signals, the signals in the lot may be reworked by the manufacturer to correct the problem. Samples from the rejected lot must be retested in order to be accepted. Records shall be kept of the reasons for rejection, the reworking performed on the rejected lot, and the results of the second test.

(1) *Lot size.* For the purposes of sampling the production of signals, a lot must consist of not more than 30,000 signals. Lots must be numbered serially by the manufacturer. A new lot must be started with: (i) any change in construction details, (ii) any change in sources of raw materials, or (iii) the start of production on a new production line or on a previously discontinued production line.

(2) *Inspections and tests by the manufacturer.* The manufacturer's quality control procedures must include inspection of materials entering into construction of the signals and inspection of the finished signals, to determine that signals are being produced in accordance with the approved plans. Samples from each lot must be tested in accordance with the operational tests in paragraph (c) of this section.

(3) *Inspections and tests by an independent laboratory.* An independent laboratory accepted by the Commandant under § 159.010 of this Chapter must perform or supervise the inspections and tests under paragraph (b)(2) of this section at least 4 times a year, unless the number of lots produced in a year is less than four. The inspections and tests must occur at least once during each quarterly period, unless no lots are produced during this period. If less than four lots are produced, the laboratory must perform or supervise the inspection and testing of each lot. In addition, the laboratory must perform or supervise the technical tests in paragraph (d) of this section at least once for every ten lots of signals produced, except that the number of technical tests must be at least one but not more than four per year. If a lot of signals tested by the independent laboratory is rejected, the laboratory must perform or supervise the inspections and tests of the reworked lot and the next lot of signals produced. The tests of each reworked lot and the next lot produced must not be counted for the purpose of meeting the requirement for the annual number of inspections and tests performed or supervised by the independent laboratory.

(c) *Operational tests.* Each lot of signals must be sampled and tested as follows:

(1) *Sampling procedure and accept/reject criteria.* A sample of signals must be selected at random from the lot. The size of the sample must be the individual sample size in Table 160.024-4(c)(1) corresponding to the lot size. Each signal in the sample is tested as prescribed in the test procedure in paragraph (c)(2) of this section. Each signal that has a defect listed in the table of defects. (Table 160.024-4(c)(2)) is assigned a score (failure percent) in accordance with the table. In the case of multiple defects, only the score having the highest numerical value is assigned to that signal. If the sum of all the failure percents (cumulative failure percent) for the number of units in the sample is less than or equal to the accept criterion, the lot is accepted. If this sum is equal to or more than the reject criterion the lot is rejected. If the cumulative failure percent falls between the accept and reject criteria, another sample is selected from the production lot and the operational tests are repeated. The cumulative failure percent of each sample tested is added to that of the previous samples to obtain the cumulative failure percent for all the signals tested (cumulative sample size). Additional samples are tested and the tests repeated until either the accept or reject criterion for the cumulative sample size is met. If any signal in the sample explodes when fired or ignites in a way that could burn or otherwise injure the person firing it, the lot is rejected without further testing. (This procedure is diagrammed in figure 160.024-4(c).)

(2) *Test procedure.* Each sample signal (specimen) must be tested as follows:

(i) *Conditioning of test specimens—water resistance.* Immerse specimen horizontally with uppermost portion of the signal approximately 25 mm (1 in.) below the surface of the water for a period of 24 hours.

(ii) *Firing and operating characteristics.* Signals shall fire and operate satisfactorily when shot from a pistol of the type described in Subpart 160.028. The parachute and pyrotechnic candle shall be ejected at approximately the maximum altitude reached by the projectile case. The parachute shall open and properly suspend the pyrotechnic candle without fouling. The pyrotechnic candle shall burn with uniform intensity and without damaging the parachute, shrouds, or leader line.

(iii) *Altitude.* The altitude reached by a signal is considered to be the height at which the parachute and pyrotechnic candle are ejected from the projectile case, as determined by visual observation against an object of known height, such as a tower or ballon, or by triangulation from two or more points of observation, or by other method satisfactory to the Commandant. The altitude reached shall be not less than 45 m (150 ft.).

(iv) *Rate of descent.* The rate of descent of a signal is considered to be the calculated average rate obtained by dividing the altitude by the time of descent to the surface. The rate of descent shall not exceed 1.8 m (6 ft.) per second.

(v) *Burning time.* The burning time of the pyrotechnic candle shall be obtained by stop watch measurement from the time distinct, sustained flame is emitted until it ceases. The burning time shall be not less than 30 seconds.

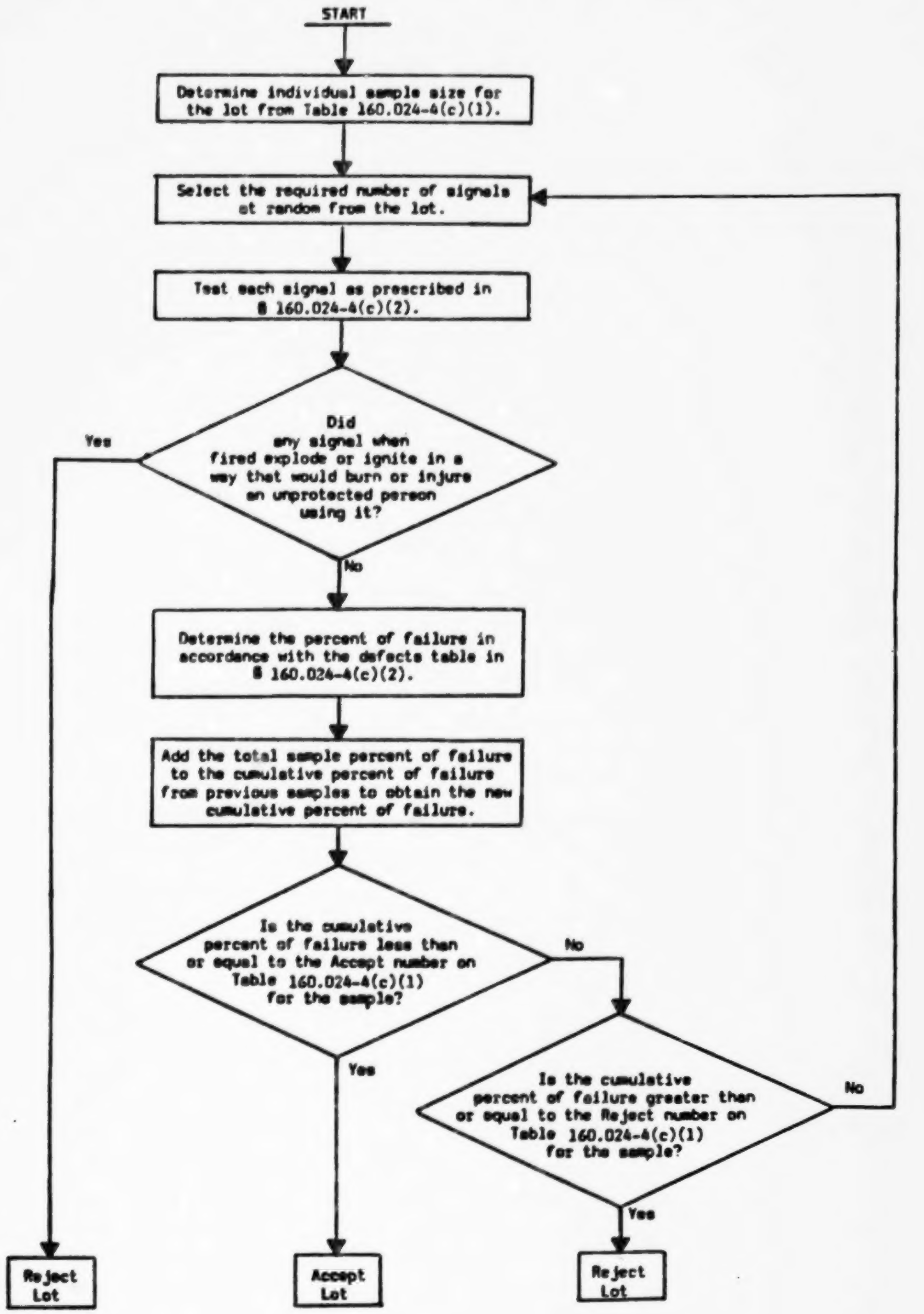

START
Determine individual sample size for the lot from Table 160.024-4(c)(1).
Select the required number of signals at random from the lot.
Test each signal as prescribed in § 160.024-4(c)(2).
Did any signal when fired explode or ignite in a way that would burn or injure an unprotected person using it?
Yes
No
Determine the percent of failure in accordance with the defects table in § 160.024-4(c)(2).
Add the total sample percent of failure to the cumulative percent of failure from previous samples to obtain the new cumulative percent of failure.
Is the cumulative percent of failure less than or equal to the Accept number on Table 160.024-4(c)(1) for the sample?
No
Yes
Is the cumulative percent of failure greater than or equal to the Reject number on Table 160.024-4(c)(1) for the sample?
No
Yes
Reject Lot
Accept Lot
Reject Lot

Figure 160.024-4(c). Operational test procedure.

TABLE 160.024-4(C)(1).—*Accept and reject criteria for operational test lots.*

Lot size	Individual sample size	Sample	Cumulative sample size	Accept [1]	Reject [1]
280 or less	8	First	8	(2)	400
		Second	16	100	500
		Third	24	200	600
		Fourth	32	300	700
		Fifth	40	500	800
		Sixth	48	700	900
		Seventh	56	950	951
281 to 500	13	First	13	0	400
		Second	26	100	600
		Third	39	300	800
		Fourth	52	500	1,000
		Fifth	65	700	1,100
		Sixth	78	1,000	1,200
		Seventh	91	1,350	1,351
501 to 1,200	20	First	20	0	500
		Second	40	300	800
		Third	60	600	1,000
		Fourth	80	800	1,300
		Fifth	100	1,100	1,500
		Sixth	120	1,400	1,700
		Seventh	140	1,850	1,851
1,201 to 3,200	32	First	32	100	700
		Second	64	400	1,000
		Third	96	800	1,300
		Fourth	128	1,200	1,700
		Fifth	160	1,700	2,000
		Sixth 2	2,100	2,300	
		Seventh	224	2,550	2,551
More than 3,201	50	First	50	200	900
		Second	100	700	1,400
		Third	150	1,300	1,900
		Fourth	200	1,900	2,500
		Fifth	250	2,500	2,900
		Sixth	300	3,100	3,300
		Seventh	350	3,750	3,751

[1] Cumulative failure percent.

[2] Lot may not be accepted. Next sample must be tested.

TABLE 160.024-4(C)(2)

Kind of defect	Percentage of failure
a. Failure to fire (when attributable to the primer and not to the malfunction of the pistol)	100
b. Failure to eject projectile contents	100
c. Failure to ignite pyrotechnic candle	75
d. Failure of parachute to open completely	75
e. Complete carrying away or destruction of parachute	75
f. Altitude less than 70 pct of that required	100
g. Altitude at least 70 pct but less than 80 pct of that required	75
h. Altitude at least 80 pct but less than 90 pct of that required	50
i. Altitude at least 90 pct but less than 100 pct of that required	25
j. Average rate of descent greater than 4 times maximum permitted	100
k. Average rate of descent less than 4 but greater than 3 times maximum permitted	75
l. Average rate of descent less than 3 but greater than 2 times maximum permitted	50
m. Average rate of descent less than twice but greater than maximum permitted	25
n. Burning time less than 70 pct of that required	100
o. Burning time at least 70 pct but less than 80 pct of that required	75
p. Burning time at least 80 pct but less than 90 pct of that required	50
q. Burning time at least 90 pct but less than 100 pct of that required	25

(d) *Technical tests.* Three signals must be subjected to each of the following tests. Two of the three signals must pass each test in order for the lot of signals to be accepted.

(1) *Luminous intensity.* The luminous intensity of each pyrotechnic candle tested shall be measured by a

visual photometer or equivalent photometric device while the specimen is supported in a horizontal position and the photometer is at right angles to the axis of the specimen. Visual luminous intensity readings shall be observed and recorded at approximately 5-second intervals during the burning of the specimen. The minimum photometric distance shall be 3 m (10 ft.). Recording photometers shall have a chart speed of at least 10 cm (4 in.) per minute. The luminous intensity of the specimen shall be computed as the arithmetical average of the readings recorded. The average luminous intensity of a specimen shall be not less than 20,000 candela.

(2) *Elevated temperature, humidity, and storage.* Place specimen in a thermostatically controlled even-temperature oven held at 75°C. with not less than 90 percent relative humidity for 72 hours. Remove specimen and store at room temperature (20° to 25°C.) with approximately 65 percent relative humidity for 10 days. If for any reason it is not possible to operate the oven continuously for the 72-hour period, it may be operated at the required temperature and humidity for 8 hours out of each 24 during the 72-hour conditioning period. (Total of 24 hours on and 48 hours off.) The signal shall not ignite or decompose during this conditioning. The signal shall fire and operate satisfactorily following this conditioning.

(3) *Spontaneous ignition.* Place the specimen in a thermostatically controlled even-temperature oven held at 75°C. with not more than 10% relative humidity for 48 consecutive hours. The signal shall not ignite or undergo marked decomposition.

(4) *Chromaticity.* The color of the burning signal must be vivid red as defined by Sections 13 and 14 of the "Color Names Dictionary." Two identical test plates of white cardboard about 30 cm x 60 cm (12" x 24") are used. Except for a negligible amount of stray daylight, the first test plate is illuminated by light from the specimen placed at a distance of about 1.5 cm (5 ft.). The second test plate is illuminated only by light from an incandescent lamp operated at a color temperature close to 2,848°K at a distance of about 30 cm (1 ft.). The first plate is viewed directly, the second through combinations of lovibond red, yellow, and blue glasses selected so as to approximate a chromaticity match. By separating the test plates by a wide unilluminated area (subtending at the observer about 45°), it is possible to make accurate determinations of chromaticity in terms of the 1931 CIE Standard Observer and Coordinate System, in spite of fluctuations in luminous intensity of the specimen by factors as high as 2 or 3. The CIE coordinates are converted to the Munsell notation which is cross-referenced to the color name in Section 13 of the "Color Names Dictionary" (see the discussion in Section 10 of "the Universal Color Language").

§ 160.024-5 Marking.

(a) *Cartridge.* Each pistol-projected parachute red flare distress signal shall be legibly marked as follows:

PISTOL-PROJECTED PARACHUTE RED FLARE
DISTRESS SIGNAL

20,000 candela—30 seconds burning time

USE ONLY WHEN AIRCRAFT OR VESSEL IS SIGHTED DIRECTIONS—Fire upward from signal pistol Service Life Expiration Date (date to be inserted by manufacturer) (Month and year manufactured) Lot No.———

Manufactured by (Name and address of manufacturer)

U.S. COAST GUARD APPROVAL
NO.———.

(b) *Marking of expiration date.* The expiration date must be not more than 42 months from the date of manufacture.

(c) *Other marking.*

(1) On each pistol-projected parachute red flare distress signal there shall be die-stamped, in figures not less than 3mm (⅛ in.) high, on the cartridge, numbers indicating the month and year of manufacture, thus: "6-54" indicating June 1954.

(2) The pyrotechnic candle shall be legibly marked with the month and year of manufacture.

(3) In addition to any other marking placed on the smallest packing carton or box containing cartridges, each carton or box shall be plainly and permanently marked to show the service

life expiration date, the date of manufacture, and the lot number.

(4) The largest carton or box in which the manufacturer ships signals must be marked with the following or equivalent words: "Keep under cover in a dry place."

NOTE: Compliance with the labeling requirements of this section does not relieve the manufacturer of the responsibility of complying with the label requirements of 15 U.S.C. 1263, the Federal Hazardous Substances Act.

§ 160.024-6 Container.

(a) *General.* The container for storing the signals on lifeboats and liferafts is not required to be of a special design or be approved by the Coast Guard. The container must meet the requirements in Subpart 160.021 (§ 160.021-6) except that the recommended type of container is illustrated in Figure 160.024-6(a), and the wording on the container must be SIGNAL PISTOL AND PISTOL-PROJECTED PARACHUTE RED FLARE DISTRESS SIGNALS.

§ 160.024-7 Procedure for approval.

(a) Signals are approved by the Coast Guard under the procedures in Subpart 159.005 of this Chapter.

§ 160.024-9 Recognized independent laboratories.

(a) The following independent laboratories have been accepted by the Commandant for conducting the approval and production tests required in this Subpart:

(b) Revised copies of this list may be obtained from Commandant (G-MMT-3/TP12), U.S. Coast Guard Headquarters, Washington, D.C. 20593.

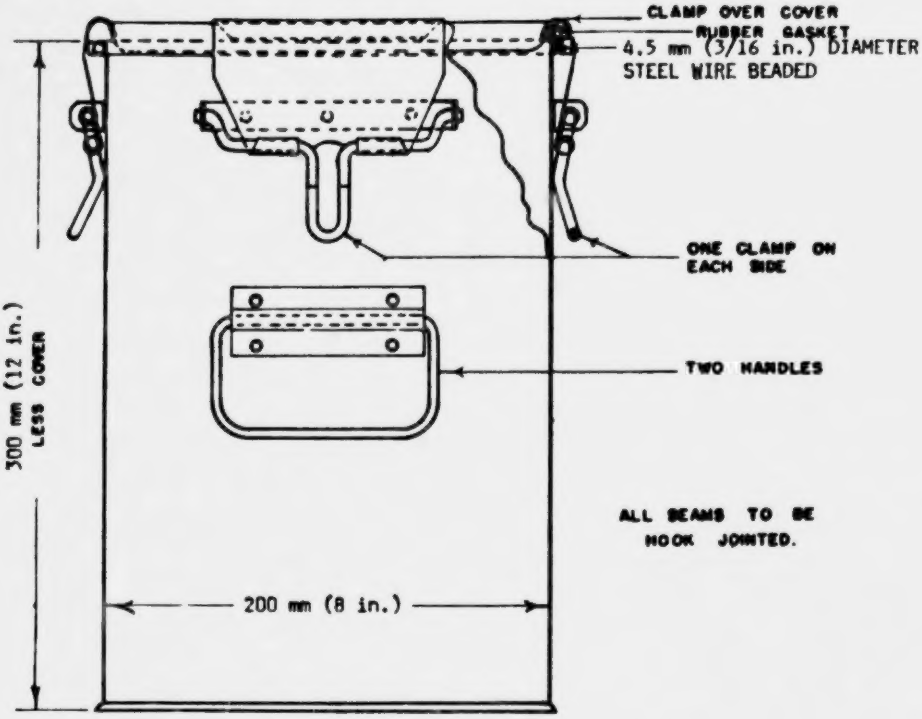

CLAMP OVER COVER
RUBBER GASKET
4.5 mm (3/16 in.) DIAMETER STEEL WIRE BEADED
ONE CLAMP ON EACH SIDE
TWO HANDLES
300 mm (12 in.) LESS COVER
ALL SEAMS TO BE HOOK JOINTED.
200 mm (8 in.)

Figure 160.024-6(a). Watertight Container for Signal Pistol and Pistol Projected Parachute Red Flare Distress Signals.

Subpart 160.026—Water, Emergency Drinking (In Hermetically Sealed Containers), for Merchant Vessels

AUTHORITY: R.S. 4417a, as amended, 4426, as amended, 4488, as amended, 4491, as amended, sec. 10, 35 Stat. 428, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, sec. 3, 54 Stat. 347, as amended, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 404, 481, 489, 395, 367, 1333, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-20, June 18, 1956, 21 FR 4894; CGFR 56-28, July 24, 1956, 21 FR 5659; 167-38, Oct. 26, 1959, 24 FR 8857.

§ 160.026-1 Applicable specifications and standard.

(a) *General.* The following specifications and standard, of the issue in effect on the date emergency drinking water is packed, form a part of this subpart:

(1) Military specifications:

MIL-L-7178—Lacquer: cellulose nitrate, gloss for aircraft use.

MIL-E-15090—Enamel, equipment, light-gray (Formula No. 111).

MIL-W-15117—Water, drinking, canned, emergency.

(2) U.S. Public Health Service:

Drinking Water Standards (Publication No. 956).

(b) *Copies on file.* Copies of the specifications referred to in this section shall be kept on file by the packer, together with the approved plans and certificate of approval issued by the Coast Guard. The military specifications may be obtained from the Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, Pa., 19120. The "Drinking Water Standards" may be obtained from the U.S. Department of Health, Education, and Welfare, Public Health Service, Washington, D.C., 20201.

[CGFR 65-9, 30 FR 11466, Sept. 8, 1965]

§ 160.026-2 Type.

(a) Emergency drinking water for lifeboats and life rafts and its hermetically sealed container shall be as specified herein, but alternate containers will be given special consideration.

[CGFR 53-25, 18 FR 7865, Dec. 5, 1953]

§ 160.026-3 Container.

(a) *General.* The emergency drinking water container shall be a sanitary type can, approximately 2$\frac{11}{16}$ in diameter by 4⅞" in height. The top and bottom of the can shall be double-seamed and compound-lined. The side seam shall be of a locked type, soldered on the outside. The can shall be made of 1.25-pound coating coke tinplate throughout, with not less than 100-pound plate for the body and 85-pound plate for the ends.

(b) *Interior and exterior coatings.* The interior of the container shall be uncoated, except for the tin-plating required by paragraph (a) of this section. In addition to the tin-plating, the exterior surfaces of the container, including the ends, but excluding the side seam, shall be lithographed a gray enamel conforming to Type I or II, Class 2 of Specification MIL-E-15090, with the marking as provided by § 160.026-5 lithographed in black print. After filling, sealing, autoclaving, and marking, the container shall be dip-coated with one coat of clear base lacquer conforming to Specification MIL-L-7178.

(c) *Plant sanitation, sterilizing and filling.* The plant and equipment in which the water is canned shall be maintained in a clean and sanitary condition at all times, and standard aseptic procedures shall be followed throughout in filling the cans. The container shall be free from all foreign materials, and shall be filled with approximately 10⅔ oz. of water meeting the requirements of § 160.026-4. After filling, it shall be hermetically sealed under vacuum, and after sealing, it shall be autoclaved at a temperature of not less than 250° F. for not less than 15 minutes.

[CGFR 53-25, 18 FR 7865, Dec. 5, 1953]

§ 160.026-4 Water.

(a) Only water meeting the U.S. Public Health Service "Drinking Water Standards" which has been suitably inhibited to protect the container against corrosion shall be used. After treatment and packing the water shall be free from organic matter, sediment and odor. It shall have a pH between 7.0 and 9.0 as determined by means of a standard pH meter using glass electrodes.

[CGFR 65-9, 30 FR 11466, Sept. 8, 1965]

§ 160.026-5 Marking.

(a) *General.* The month and year of packing and the lot number shall be embossed on the top of the container. The container shall also be lithographed on one side in accordance with § 160.026-3(b) with the following:

"U. S. Coast Guard

Approval No. —"

(Not less than 3⁄32" in height)

"Contents

Approx. 10⅔ oz."

(Not less than 3⁄32" in height)

"EMERGENCY

DRINKING

WATER"

(Not less than ⅜" in height)

(Name and address of packer)

(Not less than ⅛" in height)

(b) *Other marking.* In addition to any other marking placed on the smallest packing carton or box in which emergency drinking water containers are placed prior to shipment, each carton or box shall be plainly and permanently marked with the name and address of the packer, the month and year of packing, and the lot number.

[CGFR 53-25, 18 FR 7865, Dec. 5, 1953]

§ 160.026-6 Sampling, inspection, and tests of production lots.

(a) *General.* When packing of approved emergency drinking water for lifeboats and liferafts is to commence, the packer shall notify the Commander of the Coast Guard District in which the plant is located in sufficient time for him to assign a marine inspector to the plant to observe production methods, select samples from production, and conduct the inspections and tests required by this subpart.

(b) *Lots.* For purposes of sampling the production of approved emergency drinking water for lifeboats and life rafts, a lot shall consist of all cans of water to be offered for inspection at one time. Lots shall be numbered serially by the packer, and a new lot shall be started with any change or modification in materials or production methods.

(c) *Visual inspection of containers.* The marine inspector shall select at random from each lot the number of sample filled containers indicated in Table 160.026-6(c), which shall be examined visually for marking, exterior coating, and general compliance with the requirements of this subpart and the packer's approved drawings. If the number of defective cans exceeds the acceptance number shown in the table for the sample selected, the lot shall be rejected.

TABLE 160.026-6(c)—SAMPLING FOR VISUAL INSPECTION OF CONTAINERS

Lot size	No. of cans in sample	Acceptance number
800 and under	35	0
801 to 1,300	50	1
1,301 to 3,200	75	2
3,201 to 8,000	110	3
8,001 and over	150	4

(d) *Laboratory tests of containers and water.* The marine inspector shall select at random from each lot the number of sets of 11 filled sample containers indicated in Table 160.026-6(d1), which shall be forwarded to a recognized testing laboratory for the tests outlined in Table 160.026-6(d2), all costs of which shall be payable by the packer. If any sample is found to be non-conforming in any of these tests, the lot shall be rejected.

TABLE 160.026-6(d1)—SAMPLING FOR LABORATORY TESTS

Lot size	Number of sets of samples to be selected
3,200 and under.	1 set of 11 containers each.
3,201 and over.	2 sets of 11 containers each.

TABLE 160.026-6(d2)—DESCRIPTION OF LABORATORY TESTS

Number of containers per set of samples to be tested	Type of test	Reference specification for test procedure to be followed
2	Internal corrosion and vacuum.	MIL-W-15117.
9	Bacteriological limits and salt content.	MIL-W-15117 and U.S. Public Health "Drinking Water Standards."

(e) *Packer's tests for retention of vacuum.* All filled containers in the lot shall be held in storage by the packer for a period of two weeks from the date of filling. At the end of this two weeks storage period, the packer shall subject each container to slap tests as follows: Strike the end of the can against a firm but well padded surface to deaden any noise of impact other than the water slap which will occur if the required vacuum is present in the can. The water slap is distinguished by a sharp metallic click and is caused by the absence of air to cushion the impact of the water against the can. All cans found not to have the required vacuum shall be removed from the lot.

(f) *Additional tests by marine inspector.* Upon receiving a certified copy of the laboratory test report showing satisfactory results in the tests described in paragraph (d) of this section, and notification from the packer of completion of the tests for retention of vacuum described in paragraph (e) for the lot offered for inspection, the marine inspector shall select at random from the lot the number of filled sample containers indicated in Table 160.026-6(f). The test for retention of vacuum previously conducted by the packer shall be repeated by the inspector with the samples selected, and if any container is found not to have the required vacuum, the lot shall be rejected. If satisfactory in tests for retention of vacuum, the sample containers selected shall then be opened, and the water checked for clearness, potability and *p*H value. An accurately calibrated meter for use by the marine inspector in determining *p*H value shall be provided by the packer. If any cloudiness, discoloration, bad taste or odor, or a *p*H value of less than 7.0 or more than 9.0 is observed, the lot shall be rejected.

TABLE 160.026-6(f)—SAMPLING FOR ADDITIONAL TESTS BY MARINE INSPECTOR

Lot size	*Number of cans in sample*
500 and under	5
501 to 3,200	7
3,201 and over	10

(g) *Lot acceptance.* When the marine inspector has satisfied himself that the emergency drinking water in the lot is of a type officially approved in the name of the packer and meets the requirements of this subpart and the packer's approved drawings, the lot shall be accepted, and each of the smallest packing cartons or boxes in which the containers are sealed prior to shipment shall be plainly marked with the words, "Inspected and Passed (date), Marine Inspection Office identification letters, USCG." When permitted by the inspector, rejected lots may be resubmitted for official inspection, provided all containers in the lot have been re-worked by the packer, and all defective units removed. Emergency drinking water from rejected lots may not, unless subsequently accepted, be sold or offered for sale under representation as being in compliance with this subpart or as being approved for use on merchant vessels.

(46 U.S.C. 375, 416, 481; 49 U.S.C. 1655(b); 49 CFR 1.4(b), and 1.46)

[CGFR 53-25, 18 FR 7865, Dec. 5, 1953, as amended by CGFR 65-9, 30 FR 11466, Sept. 8, 1965; CGD 75-186, 41 FR 10437, Mar. 11, 1976]

§ 160.026-7 Procedure for approval.

(a) *General.* Emergency drinking water for lifeboats and liferafts on merchant vessels is approved only by the Commandant, U.S. Coast Guard, Washington, D.C. 20226. Correspondence pertaining to the subject matter of this Specification shall be addressed to the Commander of the Coast Guard District in which the plant is located.

(b) *Pre-approval samples and plans.* Packers who desire to pack approved emergency drinking water shall make application for approval to the Commander of the Coast Guard District who will detail a marine inspector to the factory to observe production facilities and manufacturing methods and to select a pre-approval sample of at least 24 containers made up as for service use, together with four prints of fully-dimensioned descriptive drawings showing the construction and arrangement of the container, all materials and finishes used, marking, source of water supply, and kind and amount of corrosion inhibitor used. The Commander of the Coast Guard District will forward the sample containers and drawings to the Commandant to determine compliance with this specification and suitability of the emergency drinking water for type or brand approval for use in lifeboats and life rafts on merchant vessels.

[CGFR 53-25, 18 FR 7866, Dec. 5, 1953, as amended by CGFR 65-9, 30 FR 11466, Sept. 8, 1965]

Subpart 160.027—Lifefloats for Merchant Vessels

AUTHORITY: R.S. 4417a, as amended, 4426, as amended, 4488, as amended, 4491, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, sec. 3, 54 Stat. 347, as amended, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 404, 481, 489, 367, 1333, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-20, June 18, 1956, 21 FR 4894; 167-38, Oct. 26, 1959, 24 FR 8857.

SOURCE: CGFR 49-43, 15 FR 119, Jan. 11, 1950, unless otherwise noted.

§ 160.027-1 Applicable specifications and plans.

(a) *Specifications.* The following specifications of the issue in effect on the date life floats are manufactured, form a part of this subpart:

(1) Coast Guard specification:

164.002—Balsa Wood.

(2) Military specification:

MIL-F-16143A—Floats, life (Balsa Wood).

(3) Navy Department specification:

39B5—Balsa (Ochroma).

(4) Federal specification:

C-G-496—Glue; Resin-Type (Liquid and Powder).

(b) *Plans.* The following plans of the issue in effect on the date life floats are manufactured form a part of this subpart.

(1) Coast Guard drawing:

160.027-4—Rectangular Balsa Wood Life Float, With Platform, Net, and Rigging.

(2) Navy Department, Bureau of Ships, drawings:

S8200-860050—Balsa Wood Life Float, Solid, Rectangular, Platform, Net, and Rigging (25-person capacity), Sheet 1.

S8200-860051—Balsa Wood Life Float, Solid, Rectangular, Platform, Net, and Rigging (10-, 15-, 40-, and 60-person capacity), Sheet 2.

(c) *Copies on file.* Copies of the above specifications and reference plans shall be kept on file by the manufacturer, together with the approved plans and certificate of approval.

[CGFR 49-43, 15 FR 119, Jan. 11, 1950, as amended by CGFR 53-56, 18 FR 8583, Dec. 19, 1953]

§ 160.027-2 Type.

(a) Life floats shall be of the peripheral buoyant body type with drop platform centrally located. Life floats which do not comply with all the construction provisions of this subpart, but which at least meet all the performance requirements, will be given special consideration.

§ 160.027-3 General requirements for lifefloats.

(a) Life floats shall be properly constructed of suitable materials. They shall be reversible, i.e., effective and stable floating either side up. The cross section of the buoyant body may be circular, elliptical, or rectangular in shape, and if rectangular, the corners shall be rounded to a radius of at least 3 inches. The buoyancy of the life float may be derived from solid buoyant material or from air compartments. Buoyancy shall not be dependent upon inflation.

(b) Construction, materials, and workmanship shall provide a life float, including body, platform, net, rigging, and straps, at least equivalent to the balsa wood life float specified by

§ 160.027-4; and all life floats shall be capable of passing the test for strength, watertight integrity, buoyancy, airtightness of air compartments, if any, and stability, as described in § 160.027-7.

§ 160.027-4 Balsa wood body lifefloats.

(a) Life floats having a balsa wood buoyant body shall be constructed as illustrated by Coast Guard Drawing 160.027-4; or in cases where the dimensions of the body section are suitably increased to provide at least 40 pounds per person buoyancy, they may be constructed as illustrated by Navy Department, Bureau of Ships, Drawings S8200-860050 and S8200-860051 and in accordance with the provisions of section 3 of Specification MIL-F-16143A.

(b) Balsa wood shall comply with Coast Guard Specification 164.002 for Density A wood (8½ to 12 pounds per cubic foot) or with Navy Department Specification 39B5.

(c) Glues used shall conform to the requirements of Federal Specification C-G-496, and the gluing methods employed, including spreading weight, clamping pressures, temperatures of glue and atmosphere where work is done, and curing time and temperature, shall be in accordance with the recommendations of the manufacturer of the glue.

(d) The balsa wood pieces composing each layer shall be as large as practicable in order to keep the number of pieces and the number of seams and butts to a minimum, but no layer shall be less than 2 inches in thickness. The pieces shall be so arranged in adjacent layers that butts and seams are staggered in order to give maximum rigidity to the whole and to minimize all channels through which water might penetrate. The grain of the wood shall be so laid as to give minimum end grain on the outside surface of the finished body. The use of small pieces for filling purposes in the interior of the body is prohibited. The use of small pieces for fairing purposes on the exterior of the body will be permitted: *Provided*, That the grain complies with the above requirement and that the pieces are thoroughly glued in place. All butted ends shall be square and smooth. All sides shall be smooth and straight. All butts and seams shall be tightly fitted. The use of wood dowels or skewers ¼-inch in diameter and of a length as required to prevent slippage of balsa wood in adjacent layers when gluing will be permitted.

(e) Not less than 24 hours of the glue curing time shall elapse before shaping the float body. The rough body shall then be shaped down to its approximate final form. It shall be as smooth as practicable. If any gaps are found to exist in butts or seams, they shall be filled with balsa wood shims glued in.

(f) The float body shall then be covered by a tightly wound strip of canvas wrapped spirally around the body. Where splices are necessary, the overlap shall be at least three-quarters around the float body. The canvas shall be of a strength and weight not less than No. 10, about 8 inches in width, and each wrap shall overlap the previous wrap by about one-half the width of the strip. The canvas shall be set in and covered with a coating material found acceptable for this purpose. After drying, the float body shall then be given not less than one coat of protective paint.

Note: "Hydrotuf" furnished by Atlantic-Pacific Mfg. Corp., 124 Atlantic Ave., Brooklyn, N.Y.; "Synthetic Plasoleum" furnished by Revertex Corp. of America, 3708 Northern Blvd., Long Island City, N.Y.; and "Balsa Wood Coating" furnished by Akron Paint and Varnish Co., Akron, Ohio; are coating materials which have been found acceptable. Other materials will be considered on request.

(g) The intent of paragraphs (b) through (f) of this section, is to produce a compact structure without channels or openings through which water may penetrate the interior, and that it shall not only be waterproof at its exterior surface without the aid of further covering, but that each piece of which it is constructed shall be a unit which will localize within itself any absorption due to exterior damage. Every effort shall be directed to this result during construction.

(h) The platform, netting, rigging, and straps shall be in general accordance with Coast Guard Drawing 160.027-4, or with Bureau of Ships Drawings S8200-860050 and S8200-

860051; as applicable. Care shall be taken that the platform and netting will readily pass through the life float when it is launched, regardless of which side of the life float strikes the water. All parts of the platform, including surfaces, edges, and rivets, shall be smooth and present no cutting edges, points, or splinters which may be dangerous to a barefoot person. The platform shall be finished with two coats of water-resisting spar varnish or protective paint. No plywood shall be used in the construction of any part of the platform. Suitable provision shall be made that the platform, under normal stowage conditions, will be retained in the center of the float and may readily be released from this position either on board ship or in the water.

(i) The life line around the float shall be festooned in bights not longer than 3 feet, with a seine float in each bight, which float may be omitted if the line is of an inherently buoyant material and absorbs little or no water. Pendants shall be fitted approximately 18 inches apart. The straps holding the life line and pendants shall be 3-inch cotton webbing having a breaking strength of not less than 750 pounds for the 10- and 15-person sizes, and not less than 1,500 pounds for the 25-, 40-, and 60-person sizes.

[CGFR 49-43, 15 FR 119, Jan. 11, 1950, as amended by CGFR 53-56, 18 FR 8583, Dec. 19, 1953; CGFR 58-44, 23 FR 8984, Nov. 9, 1958]

§ 160.027-5 Air compartment type lifefloats.

(a) Life floats having air compartments for buoyancy in the peripheral body shall have the shell of the body constructed of corrosion-resistant materials of sufficient thickness and strength so that the watertight integrity of the air compartments will not be destroyed in the drop tests for strength described in § 160.027-7(f).

(b) Metal joints forming air compartments shall be securely hook-jointed and soldered, riveted, or properly and securely welded by certified welders using approved electrodes or welding rods.

(c) Air compartments shall be not more than 3 feet in length and in no case shall there be fewer than 6 air compartments. Each air compartment shall be fitted with a standard one-quarter inch pipe size test nipple and fitted with a hexagonal cap, both of corrosion-resistant materials, and be so located as to be readily accessible for testing purposes.

§ 160.027-6 Capacity of lifefloats.

(a) The capacity allowed a life float shall be either 10, 15, 25, 40, or 60 persons but the capacity allowed shall not be in excess of the final buoyancy of the float body after the watertight integrity test, as described by § 160.027-7(g) and (h), divided by 40, or that established by actual demonstration with persons wearing life preservers, whichever is least.

§ 160.027-7 Methods of sampling, inspection, and tests.

(a) *General.* The marine inspector shall be admitted to the place of manufacture and will familiarize himself with the various operations involved in the construction process and, from observation during manufacture, satisfy himself that life floats are made in general accordance with this subpart and of materials and parts conforming strictly with the plans and specifications submitted by the manufacturer and approved by the Commandant. The manufacturer shall provide a suitable place and the necessary apparatus for the use of the inspector in conducting such production check tests as are done at the place of manufacture. Specimens or samplings of materials entering into construction may be taken at random, either in the raw material state or during manufacture, by the inspector, and tests made for compliance with the applicable requirements.

(b) *Factory inspections of production lots.* Life floats shall receive 100 percent surface inspection by the inspector before covering balsa wood body life floats or before painting air compartment type body life floats, as the case may be, to determine compliance with the requirements of this subpart and conformance with the plans and specifications submitted by the manufacturer and approved by the

Commandant. All air compartments shall be tested in accordance with paragraph (f) of this section. The inspector shall witness the entire construction of at least two float bodies from each lot produced.

(c) *Sampling of production lots.* A production lot shall consist of not more than 300 life floats of the same design and capacity manufactured by one factory. For lots of at least 120 but not more than 300 life floats, the sample shall consist of 4 representative complete specimen life floats selected at random from the lot by the inspector. For lots of less than 120 life floats, the sample shall consist of at least one representative complete specimen life float from each 30 life floats manufactured, selected at random by the inspector.

(d) *Testing of sample life floats from production lots.* Each sample life float selected for test from a production lot shall be subjected to the tests described in paragraphs (e) to (h), inclusive, of this section. The stability test, paragraph (i) of this section, ordinarily is not performed on samples from production lots, but may be done whenever question as to stability arises.

(e) *Strength test.* Drop or launch the complete sample life float into still water from a height of 60 feet twice, once flat and once endwise. Test all air compartments, if any, in accordance with paragraph (f) of this section. There shall be no damage to the body of the float, or other damage affecting the serviceability of the float for the purpose intended. On samples from production lots of balsa wood body type life floats beam loading tests in accordance with paragraph 4.5.3.2 of Specification MIL-F-16143A will be acceptable as an alternate to the drop tests described in this paragraph.

(f) *Test for airtight integrity of air compartments.* Subject each air compartment to an air pressure of approximately one pound per square inch. Caps shall be removed from the test nipples of adjacent compartments, allowing them to vent to the atmosphere, during this test. There shall be no leakage or structural weakness evidenced.

(g) *Watertight integrity test.* Determine the initial buoyancy of the sample float body only (platform, netting, and rigging removed) in accordance with paragraph (h) of this section. Submerge the float body for 24 hours at a depth of 10 feet or equivalent water pressure. Determine the final buoyancy of the float body in accordance with paragraph (h) of this section. The final buoyancy shall be at least 40 pounds per person capacity of the float, and the loss of buoyancy shall not exceed 5 percent of the initial buoyancy.

(h) *Buoyancy test.* Load known weights on the sample float body only (platform, netting, and rigging removed) until it is awash. The buoyancy shall be computed as equaling the downward gravitational force exerted by the weights loaded on the float, whether the weights are submerged or not. A raised platform of known weight having two runners on edge spaced so as to bear on the float body may be used to support the weights out of water to avoid the necessity for making allowances for the displacement of submerged weights. The life float body shall support at least 40 pounds per person capacity.

(i) *Stability test.* With the sample float body only (platform, netting, and rigging removed) floating in water, a weight of 15 pounds of iron per foot of length shall be suspended in the water from the life lines along the edge. The same test shall be performed per foot of width. The minimum weight along any one edge shall be 60 pounds. The life float body shall neither capsize nor become partially awash under either of these tests.

(j) *Lot acceptance or rejection.* The name plates of life floats accepted shall be marked with the Marine Inspection Office identification letters, the date, and the letters, "U.S.C.G." Inability of a sample life float to pass the tests scheduled in paragraph (d) of this section shall be considered cause for rejection of the lot. A rejected lot may be re-worked by the manufacturer to correct the kind of defect(s) found and be re-submitted for inspection and testing.

(46 U.S.C. 375, 416; 49 U.S.C. 1655(b); 49 CFR 1.4(b), and 1.46)

[CGFR 49-43, 15 FR 119, Jan. 11, 1950, as amended by CGFR 53-56, 18 FR 8583, Dec. 19, 1953; CGD 75-186, 41 FR 10437, Mar. 11, 1976]

§ 160.027-8 Name plate and marking.

(a) A substantial corrosion-resistant name plate shall be permanently attached to each life float on which is stamped the name of the manufacturer, symbol and/or serial number approval number, dimensions, number of persons capacity, and space shall be provided for the Marine Inspection Office identification letters, the date, and the letters, "U.S.C.G."

(46 U.S.C. 375, 416; 49 U.S.C. 1655(b); 49 CFR 1.4(b), and 1.46)

[CGFR 49-43, 15 FR 119, Jan. 11, 1950, as amended by CGD 75-186, 41 FR 10437, Mar. 11, 1976]

§ 160.027-9 Procedure for approval.

(a) Life floats for use on merchant vessels are approved only by the Commandant, United States Coast Guard, Washington, D.C. 20226. Before any action is taken on any design of life float, detailed plans covering fully the arrangement and construction of the life float, material specifications, and description of construction methods shall be submitted to the Commandant through the Commander of the Coast Guard District in which the life float is built.

(b) If the drawings and specifications are satisfactory, the Commander of the Coast Guard District in which the life float is to be built, shall be notified in writing when fabrication is to commence. An inspector will be assigned to observe the construction in accordance with the plans and specifications and upon completion will conduct the tests described by § 160.027-7(e) to (i).

(c) At the time that the tests are successfully completed, the manufacturer shall present to the inspector four corrected copies of the plans and specifications, including any changes or additions which may have been found necessary during construction or testing. If the manufacturer desires more than one set of approved plans, additional copies shall be submitted at that time.

(d) The marine inspector will file a report of the examinations and tests, together with the four copies of the corrected drawings and specifications, with the Commander of the Coast Guard District who will transmit them to the Commandant to determine compliance with the requirements of this subpart and suitability of the life float for type or brand approval for use on merchant vessels.

[CGFR 49-43, 15 FR 119, Jan. 11, 1950, as amended by CGFR 65-16, 30 FR 10898, Aug. 21, 1965]

Subpart 160.028—Signal Pistols for Red Flare Distress Signals

AUTHORITY: 46 U.S.C. 481, 49 U.S.C. 1655(b)(1), 49 CFR 1.46(b).

SOURCE: CGD 76-048a and 76-048b, 44 FR 73078, Dec. 17, 1979, unless otherwise noted.

§ 160.028-2 Type.

(a) Each signal pistol for launching a parachute distress signal that meets subpart 160.024 of this part must be of the center-firing type having chamber and bore dimensions within the limits indicated by Figure No. 160.028-2(a).

(b) A signal pistol for launching an aerial flare not under paragraph (a) of this section may have any chamber and bore dimensions if they are not the dimensions for a conventional round of ammunition.

§ 160.028-3 Materials, workmanship, construction, and performance requirements.

(a) *Materials.* The materials used in signal pistols shall conform strictly to the specifications and drawings submitted by the manufacturer and approved by the Commandant. In general, all parts shall be corrosion-resistant or properly protected against corrosion. The ejection mechanism shall be of material possessing excellent wearing qualities.

(b) *Workmanship.* Signal pistols shall be of first class workmanship and shall be free from imperfections of manufacture affecting their serviceability or appearance.

(c) *Construction and performance requirements.* (*Pistols intended for signals meeting subpart 160.024*). Signal pistols shall be of rugged construction and shall operate satisfactorily in firing and ejecting pistol-projected parachute red flare distress signals of the type covered by Subpart 160.024. The ejection mechanism shall be of sturdy design capable of withstanding rough and repeated usage. The overall size and weight of signal pistols should be kept to a minimum consistent with adequate strength and safety. When the pistol is cocked and the trigger is pulled, the firing pin shall project between 1.52 mm and 2.54 mm (0.060 in. and 0.100 in.) beyond the face plate of the frame. When the barrel is locked in the firing position, the barrel chamber shall be not more than 0.25 mm (0.010 in.) from the face plate of the frame.

§ 160.028-4 Approval and production tests.

(a) *Approval test.* An independent laboratory accepted by the Commandant under § 159.010 of this Chapter must test three pistols in accordance with the operational test in paragraph (c) of this section.

(b) *Production inspections and tests.* Production inspections and tests of each pistol must be conducted under the procedures in § 159.007 of this Chapter. Each pistol which passes the production inspections and tests must be stamped with the letters "P.T." Each pistol which fails the test must not be represented as meeting this Subpart or as being approved by the Coast Guard.

(1) *Inspections and tests by the manufacturer.* The manufacturer's quality control procedures must include the inspection of the pistols during production, and inspection of the finished pistols, to determine that the pistols are being produced in accordance with the approved plans. Each pistol must be tested in accordance with the operational test in paragraph (c) of this section, except that checking of the chamber and bore dimensions is not required.

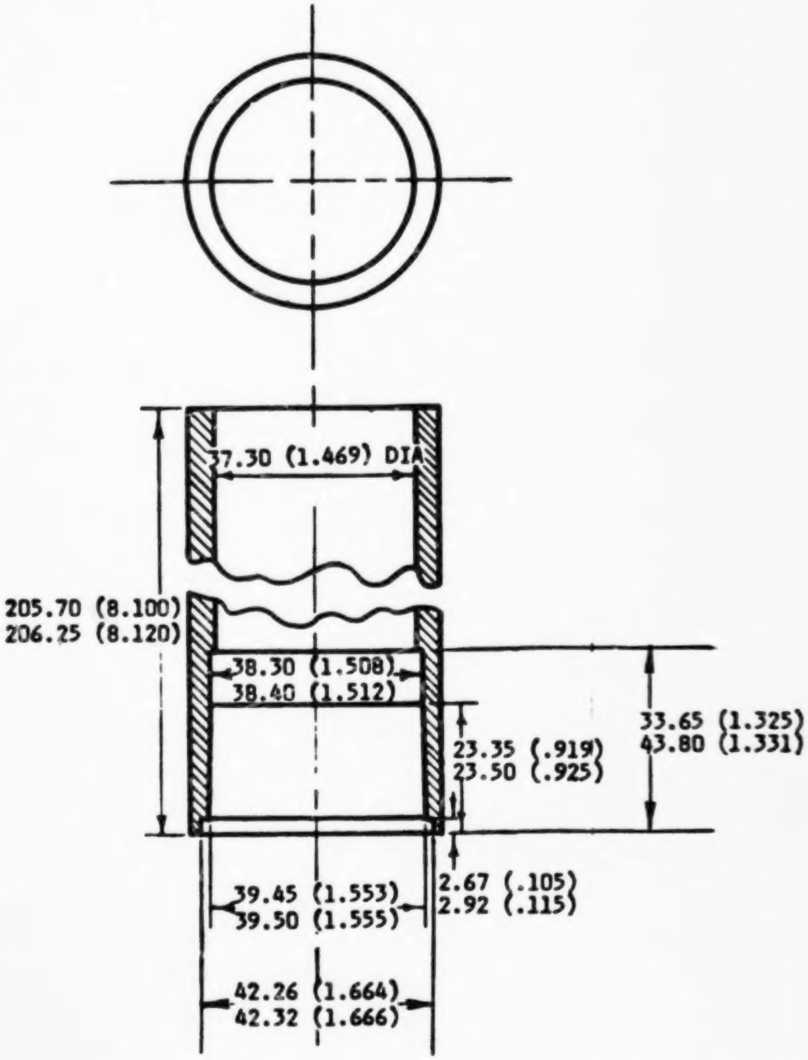
(2) *Inspections and tests by an independent laboratory.* An independent laboratory accepted by the Commandant under § 159.010 of this Chapter must inspect and test three pistols at least one each year. The inspection must determine that the pistols are being produced in accordance with the approved plans. The test must be in accordance with paragraph (c) of this section.

(c) *Operational test.* The operational test must be conducted as follows:

(1) Check the chamber and bore dimensions of the pistol.

(2) Fire a dummy cartridge simulating a normal signal in size and weight, but with a charge double the normal charge.

(3) Fire a normal signal.


37.30 (1.469) DIA
205.70 (8.100)
206.25 (8.120)
38.30 (1.508)
38.40 (1.512)
23.35 (.919)
23.50 (.925)
33.65 (1.325)
33.80 (1.331)
2.67 (.105)
2.92 (.115)
39.45 (1.553)
39.50 (1.555)
42.26 (1.664)
42.32 (1.666)

DIMENSIONS IN MILLIMETERS (INCHES)

Figure 160.028-2(a). Signal Pistol - Chamber and Bore Dimensions.

(4) Recheck the chamber and bore dimensions.

(5) The pistol must fire the signal properly, must not have any visible deformation or damage as a result of the test, and must not have any change in the chamber and bore dimensions.

§ 160.028-5 Marking.

(a) *General.* Each signal pistol shall be permanently and legibly marked with its serial number, Coast Guard approval number, and the name and address of the manufacturer.

§ 160.028-6 Container.

(a) *General.* Containers for the stowage of signal pistols and pistol projected parachute red flare distress signals in lifeboats and life rafts on merchant vessels are not required to have specific approval or to be of specific design except for certain material, marking, and test requirements, which requirements are contained in § 160.024-6 of Subpart 160.024.

§ 160.028-7 Procedure for approval.

(a) Signals are approved by the Coast Guard under the procedures in Subpart 159.005 of this Chapter.

§ 160.028-9 Recognized independent laboratories.

(a) The following independent laboratories have been accepted by the Commandant for conducting the approval and production tests required in this Subpart:

(1) (Reserved).

(b) Revised copies of this list may be obtained from Commandant (G-MMT-3/TP12), U.S. Coast Guard Headquarters, Washington, D.C. 20593.

Subpart 160.031—Line-Throwing Appliance, Shoulder Gun Type (and Equipment)

AUTHORITY: 46 U.S.C. 481, 49 U.S.C. 1655(b)(1), 49 CFR 1.46(b).

SOURCE: CGD 76-048a and 76-048b, 44 FR 73080, Dec. 17, 1979, unless otherwise noted.

§ 160.031-1 Incorporation by reference.

(a) The following Federal specification is incorporated by reference into this subpart:

(1) T-R-605 b, December 13, 1963 and Amendment 3, April 17, 1973—Rope, Manila, and Sisal.

(b) The Federal specification may be obtained from Customer Service, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA. 19120 (tel: (215)697-2000). This specification is also on file in the FEDERAL REGISTER library.

(c) Approval to incorporate by reference the material listed in this section was obtained from the Director of the Federal Register on September 24, 1979.

§ 160.031-2 Type and size.

(a) The shoulder gun type line-throwing appliance shall be breech-loading for the cartridge and muzzle-loading for the projectile, of not more than 13 mm (0.50 in.) caliber, chambered for blank rifle cartridges, smooth bored, and properly stocked, with shot line canister attached in a position below the barrel.

§ 160.031-3 Materials, construction, workmanship, and performance requirements.

(a) All materials used in the construction of shoulder gun type line-throwing appliances and equipment shall be of good quality, suitable for the purpose intended, and shall conform to the requirements of this specification. The choice of materials shall be such that resistance to corrosion by salt water or spray, shock, temperature change, and wear will be obtained. The use of dissimilar metals in combination shall be avoided wherever possible, but when such contacts are necessary, provision shall be made to prevent such deleterious effects as galvanic corrosion, freezing or buckling of moving parts, and loosening or tightening of joints due to difference in coefficients of thermal expansion.

(b) The design and construction shall be proper and substantial for effective and safe operation aboard ship.

(c) The workmanship shall be first class and free from any imperfections of manufacture affecting appearance or serviceability of the gun.

(d) The gun, when loaded and fired in accordance with the manufacturer's instructions, shall be capable of propelling through relatively still air, the service projectile with service line attached, for a distance of not less than 75 m (250 ft.) with deviation from the target not to exceed 4.5 m (15 ft.) either side.

§ 160.031-4 Equipment for shoulder gun type line-throwing appliance.

(a) Ten service projectiles, each machined from steel or bronze, weighing about 225 g (8 oz.), and having a shank of sufficient length to project slightly beyond the muzzle, with an eye at the upper end for securing the service line.

(b) Four service lines, each not less than 180 m (600 ft.) in length, of 1.5 mm (1/16-in.) or more in diameter, woven or braided nylon, very flexible, and having a breaking strength of not less than 625 N (140 lb.), or equivalent. Each line shall be one continuous length without splice, knot, or other weakening features and shall be made up or coiled in such way as to render it ready at all times for immediate use. The end of the line intended to be attached to projectile shall have securely attached thereto a substantial tag bearing a permanent legend indicating its purpose, and the other end of the line shall be tagged in the same manner to prevent delay in securing proper and immediate action with the equipment. The line shall be coiled or reeled in such manner that when all the line leaves the canister it automatically becomes unattached and free from the canister and the gun. The line canister shall be secured by clamps or brackets below the barrel of the gun.

(c) One auxiliary line consisting of at least 150 m (500 ft.) of 7.5 mm (3 in.) circumference manila complying with federal specification T-R-605.

(d) Twenty-five cartridges of the caliber and loading specified in the instructions furnished by the manufacturer of the gun. The cartridges shall be blank with waterproof paper wad.

(e) One cleaning rod with brush.

(f) One can of oil suitable for cleaning the gun and preserving the finish of the metal parts.

(g) Twelve wiping patches of a size suitable for cleaning the bore.

(h) One set of instructions including a list of the equipment furnished with the gun, the proper caliber and loading of the cartridges to be used in firing the gun, information as to the proper maintenance of the gun and equipment, and directions for loading and firing in service use shall be permanently engraved in plastic and mounted conspicuously in the case or box required by § 160.031-4(i).

(i) A suitable case or box, properly compartmented for stowage of the appliance and auxiliary equipment, is required for stowage on merchant vessels. The auxiliary line need not be stowed in the case.

§ 160.031-5 Approval and production tests.

(a) *Approval test.* An independent laboratory accepted by the Commandant under § 159.010 of this Chapter must test an appliance in accordance with the operational test in paragraph (c) of this section.

(b) *Production inspections and tests.* Production inspections and tests of each appliance must be conducted under the procedures in § 159.007 of this Chapter. Each appliance which fails the inspections and tests must not be represented as meeting this Subpart or as being approved by the Coast Guard.

(1) *Inspections and tests by the manufacturer.* The manufacturer's quality control procedures must include the inspection of appliances during production as well as inspection of finished appliances to determine that the appliances are being produced in accordance with the approved plans. Each appliance must be tested in accordance with paragraph (c) of this section except that the projectile may be fired without a service line attached, and the distance and deviation do not have to be measured.

(2) *Inspections and test by an independent laboratory.* An independent laboratory accepted by the Commandant under § 159.010 of this Chapter must inspect and test one appliance at least once each year. The inspection must determine that the appliances are being produced in accordance with the approved plans. The test must be

in accordance with paragraph (c) of this section.

(c) *Operational test.* The operational test must be conducted as follows:

(1) Three rounds must be fired by the gun, at least one of which must be with a service line attached to a projectile.

(2) The projectile must be fired first by aiming it down an open course, and measuring the distance and deviation of the projectile.

(3) After the projectile is fired, the other two rounds must be fired.

(4) The distance and deviation of the projectile must be in accordance with § 160.031-3(d) the gun must fire each round properly and the gun must not be fractured or damaged by the test.

§ 160.031-6 Marking.

(a) *Gun.* The gun shall be permanently and legibly marked on the barrel with the manufacturer's model or type designation of the gun, the serial number for the gun, the official Coast Guard approval number, and the name of the manufacturer. The gun stock shall have recessed in it a brass or other corrosion-restistant plate showing legible maintenance instructions for the care of the gun and its parts to prevent corrosion. After the proof test, the gun barrel shall be marked with the letters "P.T." and the name or mark of the company.

(b) *Projectile.* Projectiles shall be permanently and legibly marked with the name of the manufacturer.

(c) *Line and container.* The end of a service line intended to be attached to the projectile shall have securely attached thereto a substantial tag bearing a permanent legend indicating its purpose, and the other end of the line shall be tagged in the same manner to prevent delay in securing proper and immediate action with the equipment. The container of new service lines shall bear the name of the manufacturer, date of manufacture, and a statement to the effect that in all respects the line meets the requirements of this subpart for service lines. Line canisters and reels shall bear the name of the manufacturer.

§ 160.031-7 Procedure for approval.

(a) Shoulder gun line throwing appliances are approved by the Coast Guard under the procedures in Subpart 159.005 of this Chapter.

§ 160.031-9 Recognized independent laboratories.

(a) The following independent laboratories have been accepted by the Commandant for conducting the approval and production tests required in this Subpart:

(b) Revised copies of this list may be obtained from Commandant (G-MMT-3/TP12), U.S. Coast Guard Headquarters, Washington, D.C. 20593.

Subpart 160.032—Davits for Merchant Vessels

AUTHORITY: R.S. 4417a, as amended, 4426, as amended, 4488, as amended, 4491, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, sec. 3, 54 Stat. 347, as amended, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 404, 481, 489, 367, 1333, 50 U.S.C. 198, E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-20, June 18, 1956, 21 FR 4894; 167-38, Oct. 26, 1959, 24 FR 8857.

§ 160.032-1 Applicable specifications.

(a) *Specifications.* The following specifications of the issue in effect on the date the davits are manufactured form a part of this subpart:

(1) A.S.T.M. standards:

A7, Specification for Steel for Bridges and Buildings.

A27, Specification for Mild to Medium Strength Carbon Steel Castings for General Application.

A216, Specification for Carbon-Steel Castings Suitable for Fusion Welding for High Temperature Service.

(b) *Copies on file.* Copies of the specification standards referred to in this section shall be kept on file by the manufacturer, together with the approved plans and certificate of approval. The A.S.T.M. Standards may be purchased from the American Society for Testing Materials, 1916 Race Street, Philadelphia, Pa., 19103.

[CGFR 65-9, 30 FR 11466, Sept. 8, 1965]

§ 160.032-2 General requirements for davits.

(a) The requirements of this section apply to all new construction. Davits approved and in use prior to the regulations in this subpart may be continued in service if in satisfactory condition.

(b) Davits may be either of the mechanical or gravity types.

(1) Mechanical davits shall be designed to be swung out by screws, gears, or other means, using manual power for operation. Radial type davits with mechanical means for operating are not acceptable under this category.

(2) Gravity davits shall be designed to be swung out without the use of manual, electric, steam, or other power supplied by the vessel.

(3) Other types of davits will be given special consideration.

(c) Davits shall be so designed that it will not be necessary to take up or slack the falls in order to crank out the davits.

(d) For the purpose of calculations and conducting tests, the weight of the persons shall be taken at 165 pounds each.

(e) The requirements of this subpart shall be complied with unless other arrangements in matters of construction details, design, strength, equivalent in safety and efficiency are approved by the Commandant.

[CGFR 49-18, 14 FR 5112, Aug. 17, 1949]

§ 160.032-3 Construction of davits.

(a) *Strength required.* Davits shall be of such strength that the lifeboat may be lowered safely with its full complement of persons and equipment, it being assumed that the vessel is heeled 15 degrees in either direction and with a 10-degree trim. A minimum factor of safety of 6 on the ultimate strength of the materials shall be maintained at all times based on the approved working load.

(b) *Turning out.* (1) Mechanical davits shall be designed so that they may be operated from the full inboard to the full outboard position when the lifeboat is fully equipped, but not loaded with persons, it being assumed that the vessel is heeled 15 degrees in either direction and with a 10-degree trim.

(2) Gravity davits shall be designed so that they may be operated automatically from the full inboard to the full outboard position when the lifeboat is fully equipped, but not loaded with persons, it being assumed that the vessel is heeled 15 degrees in either direction and with a 10-degree trim. This operation shall be accomplished by merely releasing the brake of the lifeboat winch.

(c) *Materials.* (1) Structural steel made by the open-hearth or electric furnace process shall be in accordance with A.S.T.M. Standard Specification A7.

(2) Steel castings not intended for fusion welding shall be in accordance with A.S.T.M. Standard Specification A27, Grades U-60-30, 60-30, 65-30, 65-35, and 70-36.

(3) Steel castings intended to be fabricated by fusion welding shall be in accordance with A.S.T.M. Standard Specification A216, Grades WCA and WCB.

(4) Cast iron shall not be used in the construction of davits.

(5) Special consideration shall be given to the use of other materials. Proper affidavits concerning these materials will be required.

(d) *Bearings.* Bearings of davits shall be of non-ferrous metal, or shall be of the roller or ball-bearing type. Positive means of retaining the bearings in position and of lubricating same shall be provided except that self-lubricated bearings in sheaves of manila rope blocks will be acceptable. The manufacturer shall furnish a lubrication chart for each davit together with a plate attached to the davit indicating the lubricants recommended for extremes in temperature.

(e) *Guards.* All moving parts shall have suitable guards.

(f) *Welding.* Welding, when employed, shall be performed by welders certified by the U.S. Coast Guard, American Bureau of Shipping, or U.S. Navy Department, and the electrodes used shall be of an approved type.

[CGFR 49-18, 14 FR 5112, Aug. 17, 1949, as amended by CGFR 65-16, 30 FR 10898, Aug.

21, 1965; CGFR 65-9, 30 FR 11466, Sept. 8, 1965]

§ 160.032-4 Capacity of davits.

(a) Davits shall be approved for a working load after it has been demonstrated by detailed calculations that this working load can be carried with a minimum factor of safety of six based on the ultimate strength of the materials. It will also be necessary to conduct the tests specified in § 160.032-5.

[CGFR 49-18, 14 FR 5113, Aug. 17, 1949]

§ 160.032-5 Inspection and testing of davits.

(a) *Material testing.* (1) Where davit arms and frames are fabricated of steel castings, an inspector shall be present at the foundry where such castings are made to witness the tests prescribed by the applicable specification. The manufacturer shall furnish an affidavit stating that the material complies with the requirement of the specification noted in § 160.032-3(c) (2) or (3). The inspector shall stamp the casting with the letters U.S.C.G., the Marine Inspection Office identification letters, the letters F.T., and the date of inspection.

(2) The manufacturer shall furnish an affidavit stating that the structural steel complies with the requirements of the specification noted in § 160.032-3(c)(1).

(3) The affidavits referred to above shall be obtained from the foundry or mill supplying the material.

(b) *Factory tests for initial approval.* (1) Mechanical davits shall be tested for strength and operation at the place of manufacture in the presence of an inspector. The davits shall be completely assembled. The tests to be conducted are as noted in paragraphs (b) (2) through (4) of this section.

(2) A weight equal to 2.2 times the working load shall be suspended from the eye or end of the davit arm. With this load suspended from the davit it shall be operated from the full inboard to the full outboard position using the same operating crank or device used in actual practice aboard ship. The load shall then be swung in a fore and aft direction through an arc of approximately 10 degrees, each side of the vertical. The davit arm and frame shall show no permanent set or undue stress from this test. While this test is being conducted, the frame and arm, if of cast material, shall be subject to a test by being hammered to satisfy the inspector that the castings are sound and without flaws.

(3) A weight equal to 0.5 times the normal working load shall be suspended from the eye or end of the davit arm. This load shall be moved from the full inboard to the full outboard position using the actual handles supplied with the davit. The time required for this operation shall not exceed 90 seconds. The above test shall also be conducted with the davits set up to simulate a 15-degree inboard list with a 10-degree trim to determine that the davits may be satisfactorily operated in that condition. The above test shall also be conducted with the davits set up to simulate a 15-degree outboard list with a 10-degree trim. This test shall determine that the davit arms will not run out under the weight of the light boat.

(4) A load of 1.1 times the normal working load shall be moved from the full outboard to the full inboard position to demonstrate the strength of operation of the return mechanism.

(5) Gravity davits shall be tested for strength and operation at the place of manufacture in the presence of an inspector. The davit arms, tracks, frames, attachments, etc., shall be set up in a manner similar to an actual shipboard installation. This installation shall include a lifeboat winch suitable for gravity davits and the falls shall be reeved in the normal manner. The tests to be conducted are as noted in paragraphs (b)(6) to (8) of this paragraph.

(6) A weight equal to 1.1 times the working load shall be run from the full inboard to the full outboard position with the davit assembly in the normal upright condition. The davit arm, trackways, etc., shall show no permanent set or undue stress from this test.

(7) A weight equal to 2.2 times the working load shall be attached to the falls and suspended from the davit arm when in the full outboard position. The load shall be swung in a fore and aft direction through an arc of ap-

proximately 10 degrees each side of the vertical. The davit arm and trackways shall show no permanent set or undue stress from this test.

(8) The entire davit assembly shall then be heeled inboard 15 degrees and with a 10-degree trim. In this condition a weight equal to 0.5 times the working load shall be suspended from the falls and shall be operated from the full inboard to the full outboard position. This test shall demonstrate that the load is sufficient to turn out the davit by merely releasing the brake on the winch. Stops shall be made at intervals between the inboard and outboard positions to assure that the davit will start from any position.

(c) *Factory testing after approval.* (1) After the design of a mechanical davit has been approved, subsequent davits of the same design shall be individually tested as described in paragraph (b)(2) of this section.

(2) After the design of a gravity davit has been approved, subsequent davit arms of the same design shall be individually tested as described in paragraph (b)(7) of this section, except that the swing test may be eliminated if not practicable.

(d) *Name plate.* (1) A corrosion resistant name plate shall be affixed to each davit arm and frame on which shall be stamped the name of the manufacturer, approval number, type and serial number of the davit, maximum working load in pounds per arm together with the Marine Inspection Office identification letters, the date, and the letters "U.S.C.G."

(46 U.S.C. 375, 416; 49 U.S.C. 1655(b); 49 CFR 1.4(b), and 1.46)

[CGFR 49-18, 14 FR 5113, Aug. 17, 1949, as amended by CGFR 65-9, 30 FR 11467, Sept. 8, 1965; CGD 75-186, 41 FR 10437, Mar. 11, 1976]

§ 160.032-6 Procedure for approval of davits.

(a) Before action is taken on any design of davit, detailed plans covering fully the arrangement and construction of the davit together with stress diagrams and calculations relative to the strength of the davit, and a complete bill of material setting forth the physical properties of all materials used shall be submitted to the Commandant through the Commander of the Coast Guard District having jurisdiction over the construction of the davit.

(b) If the drawings required in paragraph (a) of this section are satisfactory the Commander of the Coast Guard District in which the davits are to be built shall be notified in writing when fabrication is to commence. An inspector will be assigned to supervise the construction in accordance with the plans and upon completion conduct the tests required by § 160.032-5.

(c) At the time that the tests are successfully completed, the manufacturer shall present to the inspector four corrected copies of the plans noted in paragraph (a) of this section, including any corrections, changes, or additions which may have been found necessary during construction or testing. If the manufacturer desires more than one set of approved plans, additional copies shall be submitted at that time.

(d) Upon receipt of corrected drawings and satisfactory test report, the Commandant will issue a certificate of approval. No change shall be made in the design or construction without first receiving permission of the Commandant via the Commander of the Coast Guard District in which the davits are built.

[CGFR 49-18, 14 FR 5113, Aug. 17, 1949]

Subpart 160.033—Mechanical Disengaging Apparatus, Lifeboat, for Merchant Vessels

AUTHORITY: R.S. 4417a as amended, 4426, as amended, 4488, as amended, 4491, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, sec. 3, 54 Stat. 347, as amended, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 404, 481, 489, 867, 1333, 50 U.S.C. 198; E.O. 11239, Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-20, June 18, 1956, 21 FR 4894; 167-38, Oct. 26, 1959, 24 FR 3857.

§ 160.033-1 Applicable specifications.

(a) *Specifications.* The following specifications of the issue in effect on the date mechanical disengaging apparatus is manufactured form a part of this subpart.

(1) Coast Guard specifications:

160.035, Specification for Lifeboats for Merchant Vessels.

(b) *Copies on file.* A copy of the specification regulations referred to in this section shall be kept on file by the manufacturer, together with the approved plans and certificate of approval. They shall be kept for a period consisting of the duration of approval and 6 months after termination of approval. The specification may be obtained from the Commandant, U.S. Coast Guard, Washington, D.C. 20226.

[CGFR 49-18, 14 FR 5113, Aug. 17, 1949, as amended by CGFR 65-16, 30 FR 10899, Aug. 21, 1965]

§ 160.033-2 General requirements for mechanical disengaging apparatus.

(a) The requirements of this subpart apply to all new construction. Mechanical disengaging apparatus approved and in use prior to the regulations in this subpart may be continued in service if in satisfactory condition.

(b) Mechanical disengaging apparatus installed in approved lifeboats shall be designed to release both ends of the lifeboat simultaneously under tension.

(c) Other types of mechanical disengaging apparatus will be considered for lifeboats fitted on vessels operating on waters other than ocean, coastwise or Great Lakes, or for vessels of 3,000 gross tons and under operating in ocean, coastwise or Great Lakes service.

[CGFR 49-18, 14 FR 5113, Aug. 17, 1949, as amended by CGFR 60-36, 25 FR 10637, Nov. 5, 1960]

§ 160.033-3 Construction of mechanical disengaging apparatus.

(a) Mechanical disengaging apparatus shall be of such strength that the lifeboat in which installed may be safely lowered with its full complement of persons and equipment. A minimum factor of safety of six on the ultimate strength of the materials used shall be maintained at all times based on the approved working load per hook.

(b) Mechanical disengaging apparatus shall be designed to release both ends of the lifeboat simultaneously under tension, which shall be effected by partially rotating a shaft which shall be continuous and extend from point of contact with the hooks. The control effecting the rotation of the shaft shall be painted bright red and shall have thereon in raised letters the words "DANGER—LEVER DROPS BOAT". The control shall be readily accessible, secured to a permanent part of the lifeboat structure, and so installed as not to interfere with the inspection of any removable parts of the lifeboat or its equipment.

(c) If closed type hooks are used, arrangements shall be made to effect the release of the falls in the event that the gear is inoperable.

(d) Positive means of lubrication shall be provided for all bearings.

(e) Welding, when employed, shall be performed by welders certified by the U. S. Coast Guard, American Bureau of Shipping, or U. S. Navy Department, and the electrodes used shall be of an approved type.

(f) The manufacturer shall furnish mill or foundry affidavits relative to the physical and chemical properties of the materials used.

[CGFR 49-18, 14 FR 5113, Aug. 17, 1949, as amended by CGFR 52-10, 17 FR 2365, Mar. 19, 1952; CGFR 57-27, 22 FR 4021, June 7, 1957]

§ 160.033-4 Inspection and testing of mechanical disengaging apparatus.

(a) *Inspection.* Mechanical disengaging apparatus shall be inspected during the course of construction to determine that the arrangement and materials entering into the construction are in accordance with the approved plans.

(b) *Factory tests for initial approval.* (1) Mechanical disengaging apparatus shall be tested to destruction in a jig built in accordance with the drawing required in § 160.033-5(a). This test shall be conducted in the presence of an inspector.

(2) Universal connections used to transmit the release power from the throw lever to the hook release shall be set up in a jig with the angles of leads set at 0.30, and 60 degrees, respectively. A load of 200 pounds shall be applied at the end of a lever arm 24 inches long. This load shall be applied

with the connecting rod secured beyond the universal and with the lever arm in the horizontal position. This test shall demonstrate that the universals have strength adequate for the purpose intended. There shall be no permanent set, or undue stress as a result of this test. Consideration will be given to arrangements other than universals submitted for this transmission of power.

(c) *Installation test prior to passing first unit installed.* (1) Each new type or arrangement of mechanical disengaging apparatus shall be tested by suspending a lifeboat loaded with deadweight equivalent to the number of persons allowed in the lifeboat (165 pounds per person) together with the weight of the equipment, plus 10 percent of the total load. The release lever shall then be thrown over with this load suspended until the lifeboat is released. This test shall demonstrate the efficiency of the installation in an actual lifeboat. (This test may be conducted ashore by suspending the lifeboat just clear of the ground.)

(d) *Factory testing after approval.* (1) In general, no factory tests after approval are required. However, each lifeboat in which mechanical disengaging apparatus is fitted shall be tested in accordance with § 160.035-13(a) of Subpart 160.035.

(e) *Name plate.* A corrosion resistant name plate shall be attached to each hook assembly giving the manufacturer's name, approval number, and approved working load (as installed).

[CGFR 49-18, 14 FR 5113, Aug. 17, 1949, as amended by CGFR 52-10, 17 FR 2365, Mar. 19, 1952; CGFR 65-9, 30 FR 11467, Sept. 8, 1965]

§ 160.033-5 Procedure for approval of mechanical disengaging apparatus.

(a) Before action is taken on any design of mechanical disengaging apparatus, detailed plans covering fully the arrangement and construction of the apparatus, together with stress diagrams and calculations relative to the strength, proposed test jig to be used in the test prescribed in § 160.033-4(b)(1), and a complete bill of material setting forth the physical and chemical properties of all the materials used shall be submitted to the Commandant through the Commander of the Coast Guard District having jurisdiction over the construction of the mechanical disengaging apparatus.

(b) If the drawings required in paragraph (a) of this section are satisfactory, the Commander of the Coast Guard District in which the mechanical disengaging apparatus is to be built, shall be notified in writing when fabrication is to commence. An inspector will be assigned to supervise the construction in accordance with the plans and upon completion, conduct the tests required by § 160.033-4.

(c) At the time that the tests are successfully completed, the manufacturer shall present to the inspector four corrected copies of the plans noted in paragraph (a) of this section, including any corrections, changes, or additions which may have been found necessary during construction or testing. If the manufacturer desires more than one set of approved plans, additional copies shall be submitted at that time.

(d) Upon receipt of corrected drawings and satisfactory test report, the Commandant will issue a certificate of approval. No change shall be made in the design or construction without first receiving permission of the Commandant via the Commander of the Coast Guard District in which the mechanical disengaging apparatus is built.

[CGFR 49-18, 14 FR 5113, Aug. 17, 1949]

Subpart 160.034—Hand Propelling Gear, Lifeboats, for Merchant Vessels

AUTHORITY: R.S. 4417a, as amended, 4426, as amended, 4488, as amended, 4491, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, sec. 3, 54 Stat. 347, as amended, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 404, 481, 489, 367, 1333, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-20, June 18, 1956, 21 FR 4894; 167-38, Oct. 26, 1959, 24 FR 8857.

SOURCE: CGFR 49-18, 14 FR 5114, Aug. 17, 1949, unless otherwise noted.

§ 160.034-1 Applicable specifications.

(a) *Specifications.* The following specification of the issue in effect on the date hand propelling gears are manufactured, form a part of this subpart:

(1) Coast Guard specification:

160.035, Specification for Lifeboats for Merchant Vessels.

(b) *Copies on file.* A copy of the specification regulations referred to in this section shall be kept on file by the manufacturer, together with the approved plans and certificate of approval. They shall be kept for a period consisting of the duration of approval and 6 months after termination of approval. The specification may be obtained from the Commandant, U.S. Coast Guard, Washington, D.C. 20226.

[CGFR 49-18, 14 FR 5114, Aug. 17, 1949, as amended by CGFR 65-16, 30 FR 10899 Aug. 21, 1965]

§ 160.034-2 General requirements for hand propelling gear.

(a) The requirements of this subpart apply to all new hand propelling gear for lifeboats. Hand propelling gear approved and in use prior to the regulations in this subpart may be continued in service if in satisfactory condition.

(b) Hand propelling gear shall be substantially constructed and fitted in a lifeboat in an efficient manner and be such that the lifeboat may be readily maneuvered away from the ship's side after being launched and steerage way maintained under adverse weather conditions. The gear shall be of such character that it may be operated by persons untrained in its use. It shall be such that it can be operated satisfactorily when the lifeboat is flooded and will be effective in propelling the lifeboat when fully or partially loaded.

(c) Hand propelling gear shall be fitted in all lifeboats having a capacity of 60 or more persons except where such lifeboats are fitted with a motor. The gear may be fitted in lifeboats of less than 60 persons capacity if desired.

(d) The requirements of this subpart shall be complied with unless other arrangements in matters of construction details, design, strength, equivalent in safety and efficiency are approved by the Commandant.

§ 160.034-3 Construction of hand propelling gear.

(a) The gear, propeller shaft, handles, etc., shall be of such strength that if the propeller shaft is secured to prevent rotation, the parts making up the gear will show no permanent set or undue stress when subjected to a maximum pull of 200 pounds on each of the handles operating the gear.

(b) The exposed parts of the hand propelling gear shall be constructed of corrosion resistant materials and the gears shall be fully inclosed and operate in an oil bath. The oil shall be of a grade that will not materially thicken at low temperatures. Screws, nuts, bolts, pins, keys, etc., securing moving parts, shall be fitted with suitable lock washers, cotter pins, locks, or other devices to keep them from coming adrift.

(c) The hand propelling gear shall be fitted with a clutch having "ahead", "neutral", and "reverse" positions and these positions shall be plainly and permanently marked at the clutch lever.

§ 160.034-4 Inspection and testing of hand propelling gear.

(a) *Factory tests for initial approval.* (1) Hand propelling gear shall be inspected during the course of construction to determine that the arrangements and materials entering into the construction are in accordance with the approved plans, and to insure that the workmanship is of good quality.

(2) The hand propelling gear shall be tested to determine that there is sufficient room to handle the hand propelling gear in a lifeboat loaded with its allowed capacity of persons.

(3) With the propeller shaft secured and the clutch in the "ahead" position, a man shall be seated at each station. With these men exerting as much pull as possible on the ends of the handles, there shall be no failure, permanent set, or undue stress in the entire assembly. This same test shall be conducted with the clutch in the "astern" position.

(4) The hand propelling gear shall be tested for its operating characteristics by manning each of the handles and ballasting a lifeboat to its fully loaded condition with either persons

or equivalent weight. It must be demonstrated that the hand propelling gear will propel the lifeboat with only a normal amount of effort while maintaining an average speed of not less than 3 knots over a measured course of not less than 1,000 feet. The backing and steering qualities shall be tested under the full load condition and it must be demonstrated that no material stopping time or effort is required to shift from ahead to astern or vice versa.

(5) The hand propelling gear shall be tested to determine its efficiency with the propeller partially out of water by removing the complement other than those at the handles, or the equivalent weight, if so provided. It must be demonstrated that the hand propelling gear will propel the lifeboat with only a normal amount of effort while maintaining an average speed of not less than 3 knots over a measured course. The backing and steering qualities shall be tested in this condition and it must be demonstrated that no material stopping time or effort is required to shift from ahead to astern or vice versa.

(6) It shall be determined by test that the lifeboat can hold course under adverse weather conditions in either the light or loaded condition.

(7) After the foregoing tests have been completed, the hand propelling gear shall be disassembled and checked for conformance with the approved drawings and for wear of the gears, etc., or other evidences of unfitness for prolonged service.

(b) *Factory testing after approval.* The inspector, when satisfied that the construction and materials are in accordance with the approved drawings and specifications, shall test the installation by operating the gear in the "ahead", "neutral", and "astern" positions while the lifeboat is in the manufacturer's plant.

(c) *Name plate.* A corrosion resistant name plate shall be affixed to the top of the gear case of each hand propelling gear on which is shown the name of the manufacturer, approval number, symbol, and serial number. An additional plate or other suitable permanent marking shall be installed bearing the designation of the manufacturer's recommended lubricant.

§ 160.034-5 Procedure for approval of hand propelling gear.

(a) Before action is taken on any design of hand propelling gear, detailed plans covering fully the arrangement and construction of the gear shall be submitted to the Commandant, through the Commander of the Coast Guard District in which the hand propelling gear is built.

(b) If the drawings required in paragraph (a) of this section are satisfactory, the Commander of the Coast Guard District in which the hand propelling gear is to be built, shall be notified in writing when fabrication is to commence. An inspector will be assigned to supervise the construction in accordance with the plans and upon completion conduct the tests required by § 160.034-4.

(c) At the time that the tests are successfully completed, the manufacturer shall present to the inspector four corrected copies of the plans noted in paragraph (a) of this section, including any corrections, changes, or additions which may have been found necessary during construction or testing. If the manufacturer desires more than one set of approved plans, additional copies shall be submitted at that time.

(d) Upon receipt of corrected drawings and satisfactory test report, the Commandant will issue a certificate of approval. No change shall be made in the design or construction without first receiving permission of the Commandant via the Commander of the Coast Guard District in which the hand propelling gear is built.

Subpart 160.035—Lifeboats for Merchant Vessels

AUTHORITY: R.S. 4417a, as amended, 4426, as amended, 4488, as amended, 4491, as amended, sec. 10, 35 Stat. 428, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, sec. 3, 54 Stat. 347, as amended, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 404, 481, 489, 395, 367, 1333, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-20, June 18, 1956, 21 FR 4894;

CGFR 56-28, July 24, 1956, 21 FR 5659; 167-38, Oct. 26, 1959, 24 FR 8857.

Source: CGFR 65-9, 30 FR 11467, Sept. 8, 1965, unless otherwise noted.

§ 160.035-1 Applicable specifications.

(a) *Specifications.* The following specifications, of the issue in effect on the date lifeboats are manufactured form a part of this subpart.

(1) A.S.T.M. standards:

A 525—Specification for Delivery of Zinc-Coated (Galvanized) Iron or Steel Sheets, Coils, and Cut Lengths Coated by Hot Dip Method.

A 36—Specification for Structural Steel

(2) Military specifications:

MIL-P-18066—Plywood, Ship and Boat Construction.
MIL-Y-1140—Yarn, Cord, Sleeving, Cloth and Tape—Glass.
MIL-M-15617—Mats, Fibrous Glass, For Reinforcing Plastics.
MIL-R-7575—Resin, Polyester, Low-Pressure Laminating.
MIL-P-40619—Plastic Material, Cellular Polystyrene.
MIL-P-17549—Plastic Laminates, Fibrous Glass Reinforced, Marine Structural.
MIL-P-19644—Plastic Foam, Molded Polystyrene (Expanded Bead Type).
MIL-C-19663—Cloth, Glass, Woven Roving For Plastic Laminate.
MIL-R-21607—Resins, Polyester, Low Pressure Laminating, Fire Retardant.
MIL-P-21929—Plastic Material, Cellular Polyurethane, Rigid, Foam-In-Place, Low Density.

(3) Federal specifications:

TT-P-59—Paint, Ready-Mixed, International Orange.

(4) Federal test method standard:

406—Plastics: Method of Testing.

(5) Federal Communications Commission:

47 CFR Part 83, Rules Governing Stations on Shipboard in the Maritime Service.

(6) Coast Guard specifications:

160.033—Mechanical Disengaging Apparatus (For Lifeboats).
160.034—Hand Propelling Gear (For Life boats).
161.006—Searchlights, Motor Lifeboat.

(b) *Copies on file.* Copies of the specifications and rules referred to in this section shall be kept on file by the manufacturer, together with the approved plans and certificate of approval. The Coast Guard Specifications may be obtained upon request from the Commandant. United States Coast Guard Headquarters, Washington, D.C. 20226. The A.S.T.M. Standards may be purchased from the American Society for Testing Materials, 1916 Race Street, Philadelphia, Pa. 19103. The Military Specifications may be obtained from the Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, Pa. 19120. The Federal Communications Commission's Rules and Regulations may be obtained from the Federal Communications Commission, Washington, D.C. 20554. Federal Specifications and Standards may be obtained from the General Services Administration, Business Service Center, Washington, D.C. 20407.

[CGFR 65-9, 30 FR 11467, Sept. 8, 1965, as amended by CGD 72-133R, 37 FR 17039, Aug. 24, 1972]

§ 160.035-2 General requirements for lifeboats.

(a) The requirements of this subpart apply to all new construction. Lifeboats approved and in use prior to the regulations in this subpart may be continued in service if in satisfactory condition.

(b) All lifeboats must be properly constructed and shall be of such form and proportions that they shall be readily maneuverable, have ample stability in a seaway, and sufficient freeboard when fully loaded with their full complement of persons and equipment. All lifeboats shall be capable of maintaining positive stability when open to the sea and loaded with their full complement of persons and equipment. All lifeboats must be open boats with rigid sides having internal buoyancy only. Lifeboats with a rigid shelter may be approved, provided that it may be readily opened from both inside and outside, and does not impede rapid embarkation and disembarkation or the launching and handling of the lifeboat.

(c) Lifeboats may be constructed of steel, aluminum, fibrous glass reinforced plastic (FRP), or other materials receiving specific approval: *Pro-*

vided, That, the weight of the fully equipped and loaded lifeboat shall not exceed 44,800 pounds, and the carrying capacity calculated in accordance with § 160.035-9 of this specification shall not exceed 150 persons.

(1) The thwarts, side benches and footings of lifeboats shall be painted or otherwise colored international orange in accordance with Federal Specification TT-P-59. The area in way of the red mechanical disengaging gear control lever, from the keel to the side bench, shall be painted or otherwise colored white, to provide a contrasting background for the lever. This band of white should be approximately 12 inches wide depending on the internal arrangements of the lifeboat.

(d) For the purpose of calculations and conducting tests, the weight of the persons shall be taken at 165 pounds each.

(e) Motor lifeboats are classified as follows:

(1) A Class 1 motor lifeboat is one that is fitted with a compression ignition engine, is capable of being readily started in all conditions, and has sufficient fuel for 24 hours continuous operation. The speed ahead in smooth water when loaded with its full complement of persons and equipment shall be at least 6 knots.

(2) A Class 2 motor lifeboat shall meet the Class 1 requirements, and in addition, shall be fitted with a searchlight constructed in accordance with Subpart 161.006 of Subchapter Q (Specifications) of this chapter.

(3) A Class 3 motor lifeboat shall meet the Class 2 requirements, and in addition, shall be fitted with a radio cabin and a radio installation complying with requirements of the Federal Communications Commission.

§ 160.035-3 Construction of steel oar-propelled lifeboats.

(a) *Type.* Lifeboats shall have rigid sides and be fitted with internal buoyancy so arranged that the boats will float in the flooded condition when fully loaded with persons and equipment. The capacity of an oar-propelled lifeboat is limited to a maximum of 59 persons. Lifeboats designed to carry 60 but not more than 100 persons shall be either hand-propelled or motor-propelled. Lifeboats designed to carry more than 100 persons shall be motor-propelled, except that a lifeboat designed to carry more than 100 persons may be hand-propelled if it is a replacement for a previously approved hand-propelled lifeboat.

(b) *Specifications.* The following specifications and schedule of lifeboat materials, including Table 160.035-3 shall be complied with unless other arrangements in matters of construction details, design, and strength, equivalent in safety and efficiency are approved by the Commandant.

TABLE 160.035-3

Length of boat not over (feet)	Bar keel, stem, and sternpost (inches)	Gunwales		Shell plating		Thwarts			Stanchions (inches)	Painter shackles (normal size)	Rudder thickness (inches)
		Angle bar (inches)	Flanged flat bar (inches)	Side (USSG)	Bottom (USSG)	Number required	Distance from top of thwart to top of gunwale (inches)	Size (inches)			
12.0	2½x½	2x1½x¼	3½x¼	18	18	4	9	1¹⁄₁₆x7½	1¹⁄₁₆x3½	⅝	1
14.0	2½x½	2x1½x¼	3½x¼	18	18	4	9	1¹⁄₁₆x7½	1¹⁄₁₆x3½	⅝	1
16.0	2½x½	2x1½x¼	3½x¼	18	18	4	9	1¹⁄₁₆x7½	1¹⁄₁₆x3½	⅝	1
18.0	2½x⅝	2x2x¼	4x¼	18	18	4	9	1⁵⁄₁₆x7½	1⁵⁄₁₆x3½	⅝	1
20.0	2½x¾	2x2x¼	4x¼	16	16	5	9	1⁵⁄₁₆x7½	1⁵⁄₁₆x3½	⅝	1
22.0	2½x¾	2x2x¼	4x¼	16	14	5	9	1⁵⁄₁₆x7½	1⁵⁄₁₆x3½	¾	1¼
24.0	3x¾	2½x2x¼	4½x¼	16	14	5	10	1⅝x9½	1⅝x5½	¾	1¼
26.0	3x¾	2½x2x¼	4½x¼	14	13	6	10	1⅝x9½	1⅝x5½	¾	1¼
28.0	3½x¾	2½x2½x¼	5x¼	13	12	6	10	1⅝x9½	1⅝x5½	¾	1¼
30.0	3½x¾	2½x2½x¼	5x¼	13	12	7	11	1⅝x9½	1⅝x5½	¾	1¼
32.0	4x¾	2½x2½x¼	5x¼	13	12	7	11	1⅝x11½	1⅝x5½	¾	1¼
34.0	4x¾	2½x2½x⁵⁄₁₆	5x⁵⁄₁₆	12	12	8	11	1⅝x11½	1⅝x5½	¾	1¼
36.0	4x1	2½x2½x⁵⁄₁₆	5x⁵⁄₁₆	12	12	8	11	1⅝x11½	1⅝x5½	¾	1¼

NOTE: Hoisting shackles, if provided, shall have a factor of safety of 6 based on the lowering weight of the fully loaded lifeboat.

(c) *Materials.* (1) Plating for shell, floors, air tanks, etc., shall be made by the open-hearth or electric furnace process in accordance with A.S.T.M. Standards A-525 Class 1.25 Commercial. The bend tests required by these specifications shall be made after the galvanizing or other anticorrosive treatment has been applied.

(2) Rivets and rolled or extruded shapes such as keel, stem, sternpost, gunwales, etc., shall be made by the open-hearth or electric furnace process in accordance with A.S.T.M. Standard Specification A-36. Consideration will be given to the use of other steels having equivalent strength where longitudinal cold forming is necessary.

(d) *Riveting.* (1) Where riveting is employed in the construction of the shell double riveting shall be used. The centers of the rivets in the row nearest the edge of the sheet shall be not less than ⅜ inch nor more than ½ inch from the edge. Rivets shall be staggered with not less than 18 rivets to the foot and shall be countersunk head or button head rivets. The diameter of the rivets shall be not less than that shown in Table 160.035-3(d)(1).

TABLE 160.035-3(d)(1)

Plating thickness	*Rivet diameter (inch)*
18 USSG	⅛
16 USSG	⅛
14 USSG	5/32
13 USSG	5/32
12 USSG	3/16

(2) Riveting of the shell plating to the keel, stem, and sternpost shall be button head rivets, staggered with not less than 12 rivets to the foot. The distance from the edge of the plate to the centers of the rivets in the nearest row shall be not less than ½ inch nor more than ¾ inch. Rivets connecting the shell to the gunwale shall be spaced not more than 3 inches on centers. The size of the rivets for connecting the shell plating to the keel, stem, sternpost, and gunwale shall be ¼-inch diameter for boats 28 feet and under, and 5/16-inch diameter for boats over 28 feet.

(3) The connection of the floors to the shell shall be by a single row of rivets not less than 3/16 inch in diameter and spaced not more than 3 inches on centers.

(e) *Welding.* (1) Welding may be substituted for riveting in any location. It shall be performed by welders qualified by the U.S. Coast Guard, American Bureau of Shipping, or U.S. Navy Department, and only approved electrodes shall be used. Details of the joints shall be indicated on the construction drawings submitted for approval.

(f) *Keel, stem and sternpost.* (1) Dimensions shall be not less than those shown in Table 160.035-3.

(2) The keel, stem, and sternpost shall be in not more than two lengths except in the case of a lifeboat of stern frame construction where three lengths may be used. The scarph shall have a length of nine times the thickness of the keel and shall be strapped and riveted. A double Vee butt weld may be used without straps.

(g) *Shell plating.* (1) The gage of the shell plating shall be not less than that shown in Table 160.035-3.

(2) Where increased thickness of bottom plating is called for by Table 160.035-3, the thicker plating shall be fitted to approximately the turn of the bilge.

(3) Doubling plates of suitable size shall be fitted on all lifeboats where the shell is liable to damage, wear, or corrosion from contact with chocks. Doublers shall be not less than the thickness of the bottom plating.

(4) All seam and butt laps shall be at least 1¼ inches.

(5) The laps of joints on keel, stem and sternpost shall be at least 2 inches.

(6) All seam and butt laps, laps of plating on keel, stem, and sternpost, shall be made over felt laid in wet red lead. Other methods will be given separate consideration.

(h) *Floors.* (1) Floors shall be fitted in lifeboats 24 feet in length and over.

(2) Floors shall be of a thickness not less than that of the bottom plating and shall be at least 6 inches deep at the centerline of the lifeboat, and shall be flanged 1½ inches top and bottom. The floors shall extend to approximately the turn of the bilge.

(3) The maximum floor spacing for boats 28 feet and under shall be 36

inches and for boats over 28 feet but not exceeding 36 feet shall be 30 inches.

(4) Limber holes shall be cut in the floors and so located as to provide efficient drainage. The limber holes shall be so arranged that the load on the floors is taken by the keel as well as by the shell plating.

(i) *Gunwales.* (1) Dimensions of angular gunwales shall be not less than that shown in Table 160.035-3.

(2) The gunwales on each side of the lifeboat shall be in not more than two pieces. If the gunwales are fitted in two lengths, the joint shall be placed at approximately one-third of the length from the stem or stern of the boat and at opposite ends of the boat. The joint may be riveted or welded, and if riveted, the backing-up piece shall be angular in section of the thickness of the gunwale, and the length shall be not less than eight times the depth of the gunwale. A suitable butt weld may be used without backing-up bar.

(3) Flanged plates made from flat bars, dimensions of which shall be not less than that shown in Table 160.035-3, may be substituted for angle gunwales. The legs of the angles shall be approximately equal and the inside radius of the bend shall be not less than ½ inch nor more than ¾ inch. The vertical leg shall be outside of the sheer strake.

(4) Wood gunwales when installed in metal lifeboats shall be of clear grained oak or teak. They shall be of a size as listed in the table below. When in two lengths the scarph shall be located as outlined in paragraph (i)(2) of this section. Scarphs shall be of a good long bevel type stiffened on the under side by a piece of the same size and material as the gunwale and at least 2 feet in length. The lap of the wooden gunwale to the sheer strake shall be made over felt laid in wet red lead and the gunwale shall be secured to the sheer strake with fastenings placed on 3-inch centers.

TABLE 160.035-3(i)(4)

Length of lifeboat	Depth of gunwale (inches)	Width of gunwale (inches)
12 feet and not over 18 feet	1⅞	2⅛
Over 18 and not over 20 feet	1⅞	2¼
Over 20 and not over 22 feet	2	2⅜
Over 22 and not over 24 feet	2¼	2½
Over 24 and not over 26 feet	2⅜	2⅝
Over 26 and not over 28 feet	2⅝	2¾

(j) *Nosings.* (1) The outside of the gunwale angle shall have a nosing fitted to the gunwale of hollow steel, half round, 2 inches by ¼ inch. If a flanged plate gunwale is used, a nosing will not be required.

(2) The outside of a wooden gunwale shall have a nosing of clear grain oak or teak, secured to the sheer strake and the gunwale by fastenings spaced on 6-inch centers which fastenings may be substituted for alternate fastenings between the gunwale and sheer strake. On boats not over 20 feet long, the flat side of the nosing shall be not less than 1½ inches wide and ⅝ inch thick, on boats not over 24 feet in length it shall be not less than 1⅞ inches wide by 1 inch thick, on all boats over 24 feet in length it shall be not less than 2¼ inches wide by 1 inch thick.

(k) *Gunwale braces.* (1) The brace shall be bent outboard at the thwart so that the bolts and nuts do not obstruct the seating space. The gunwales shall be secured to the thwarts by steel braces, bolts, and rivets as follows:

TABLE 160.035-3(k)(1)

Length of lifeboat	Brace size (inches)	Bolts and rivets diameter (inch)
22 feet and under	3 x ¼	5/16
Over 22 feet and not over 28	3 x 5/16	⅜
Over 28 feet	3 x ⅜	7/16

(2) The gunwale braces shall be bolted to the thwarts with at least two carriage bolts of a size not less than that noted in Table 160.035-3(k)(1) and riveted or welded to the gunwales. Where riveted to the gunwale, at least

two rivets of a size not less than that noted in the table above shall be used.

(3) Bracket type gunwale braces will be given special consideration.

(l) *Breast plates.* (1) Breast plates shall be fitted to the stem and stern post. The thickness of the breast plates shall not be less than the thickness of the leg of the gunwale and the depth of the throat of the plate shall not be less than twice the depth of the gunwale. The breast plates of the boats that have mechanical disengaging apparatus shall be extended to connect and reinforce the hoisting plates of the disengaging apparatus.

(2) Breast hooks for wooden gunwales shall be of the strap type, not less than 1½ inches wide, nor less than ¼ inch thick. The length of each leg of the breast hook shall be not less than 5 times the width of the gunwale. The inside strap shall be continuous and the outside strap may be in two pieces provided they are through riveted to the stem or stern post. The inner and outer straps shall be through riveted or bolted to each other through the gunwale and sheer strake by not less than three rivets or bolts on each side.

(m) *Seats.* (1) The thwarts, side benches, and end benches shall be of fir, yellow pine, fibrous glass reinforced plastic (F.R.P.), or approved equivalent.

(2) The dimensions of the thwarts shall be not less than that shown in Table 160.035-3. The mast thwart, if cut out in way of the mast, shall be suitably increased in width so that the width in way of the mast is not less than that required for other thwarts.

(3) The number of thwarts shall not be less than that set forth in Table 160.035-3.

(4) The distance from the top of the thwarts to the top of the gunwale shall be not less than that shown in Table 160.035-3.

(5) The thwart ends shall be fitted between flanges, or may be installed on top of both flanges, of a thickness not less than the bottom shell plating and secured to the thwart by two bolts in addition to the bolts through the gunwale braces. Each flange shall be riveted to the shell with rivets of the same size as used to connect the side and bottom plating and spaced not less than ten to the foot. The flanges shall extend inboard to take the brace bolts and shall be 1 inch in width less than the thwart. The ends of the thwart shall be not less than ⅜ inch and not more than ¾ inch from the shell.

(6) The edges of all thwarts, side, and end benches shall be well rounded.

(7) Suitable foot rests shall be furnished at a distance of between 17 to 20 inches below the thwarts and side benches. This may be accomplished by raising the footings from the bottom of the boat.

(8) Side and end benches shall be solid or close planked, not less than the following thicknesses:

TABLE 160.035-3(m)(8)

Length of lifeboat	Fir or pine (inch)	Plywood [1] (inch)
Up to 24 feet	¾	⅝
24 feet to and including 36 feet	1	¾

[1] Plywood, if used, shall be at least equal to Military Specification MIL-P-18066, Plywood, Ship and Boat Construction, Class 1, or Commercial Standard CS-45 for Douglas-Fir Plywoods Exterior Grades A-A, A-B, A-C, or B-B, "Marine Exterior".

(9) The leading edge of the thwart or end bench shall be located a minimum of 3 inches and a maximum of 6 inches distance from the Rottmer release gear.

(n) *Stretchers.* (1) Stretchers of sufficient size and strength shall be fitted in suitable positions for rowing.

(o) *Stanchions.* (1) Fir or yellow pine stanchions of a size not less than that shown in Table 160.035-3 shall be fitted in all lifeboats where the unsupported length of the thwarts exceeds 4 feet.

(p) *Footings.* (1) Fir, pine, or plywood footings, of a thickness not less than that shown in paragraph (m)(8) of this section, shall cover the bottom of the lifeboat between the side tanks. If fir or pine footings are used, they shall be not less than 7½ inches wide or more than 9½ inches wide and they shall be spaced not more than 2 inches apart.

(2) The footings shall be made readily detachable and so arranged that the drain plugs are at all times directly ac-

cessible without removing the footings.

(q) *Disengaging apparatus.* (1) Connections for the disengaging apparatus shall have a minimum factor of safety of six.

(2) For construction and capacity of disengaging apparatus, see Subpart 160.033.

(r) *Plugs.* (1) Each lifeboat shall be fitted with an automatic plug so designed and installed as to insure complete drainage at all times when the boat is out of the water. The automatic plug shall be provided with a cap attached to the lifeboat by a suitable chain. The location of drain plug is to be marked on the vertical surface in the vicinity of the plug below the side bench with the word "plug" in 3-inch white letters and with an arrow pointing in the direction of the drain plug.

(s) *Protection against corrosion.* (1) All steel or iron entering into the construction of lifeboats shall be galvanized by the hot dipped process. All fabricated pieces or sections are to be galvanized after fabrication. Other methods of corrosion prevention will be given special consideration.

(2) Where welded construction is employed, the material shall be galvanized after welding unless impractical to do so in which case consideration will be given to equivalent protection.

(3) Provisions shall be made to obtain a satisfactory bond between the metal and the paint.

(t) *Rudders.* (1) Each lifeboat for vessels in ocean, coastwise, and Great Lakes service shall be fitted with a rudder and tiller. The rudder shall be constructed of clear straight grained oak, properly strengthened with drifts or straps or plywood properly strengthened with straps of a thickness not less than that shown in Table 160.035-3. The thickness may be reduced ⅛ inch if check pieces are fitted extending beyond the lower pintle connection. The oak rudder shall be stiffened across the bottom edge by a piece of wood of the same character or by a metal shoe. Plywood rudders shall be stiffened across the bottom edge by a metal shoe of a "U" type construction, with the fasteners located on the sides of the rudder in lieu of the bottom. Consideration will be given to the use of hollow metal rudders provided they are designed to float. Plywood, if used, shall be at least equal to Military Specification MIL-P-18066, Plywood, Ship and Boat Construction, Class 1, or Commercial Standard CS-45 for Douglas-Fir Plywoods Exterior Grades A-A, A-B, A-C, or B-B, "Marine Exterior". The rudders shall be fitted with a ½-inch diameter manila lanyard of such length as to permit the rudder to be shipped without untying the lanyard.

(2) The lower attachment of the rudder to the sternpost shall be by a gudgeon and pintle. The upper attachment shall be of the triple or double gudgeon drop pin type. Where the double gudgeon type is used, the pin shall be attached to the rudder by a chain.

(3) A suitable hinged or pivoted tiller shall be provided.

(4) Rudder stops shall be provided to limit the rudder angle to approximately 45 degrees each side of the centerline.

(u) *Buoyancy tanks.* (1) All lifeboats shall have inherent buoyancy, or shall be fitted with buoyancy tanks or other equivalent noncorrodible buoyancy units, which shall not be adversely affected by oil or oil products, sufficient to float the boat and its equipment when the boat is flooded and open to the sea. An additional volume of buoyancy, or buoyancy units, equal to at least one-tenth the cubic capacity of the lifeboat shall be provided.

(2) At least 50 percent of the buoyancy shall be located along the sides of the boat and it shall be so located that the boat will be on even keel when flooded.

(3) The tops of the buoyancy tanks or buoyancy units shall be protected by the side benches or other suitable means. The construction shall be such that water will not collect on the tops of the tanks.

(4) The buoyancy tanks shall have a name plate attached in such a location as to be visible from within the boat. The name plate shall be in accordance with paragraph (u)(7)(iv) of this section.

(5) Buoyancy tanks shall be double riveted and caulked, hook jointed and soldered, or welded.

(6) *Independent buoyancy tanks.* (i) Independent buoyancy tanks shall be securely fastened in such a manner that they may be temporarily removed for inspection purposes. Fastenings shall not pierce the buoyancy tanks.

(ii) The material for the buoyancy tanks shall be of a thickness not less than that noted below:

Capacity (cubic feet)	*USSG*
Not over 6	22
Over 6, not over 15	20
Over 15	18

(iii) A bolted inspection plate shall be provided in such a location that the tank will be accessible for inspection and repair.

(iv) Each independent buoyancy tank shall be filled with buoyancy material. The amount of material required shall be determined by the flooding test in accordance with § 160.035-11(b)(2). The buoyancy materials used shall meet the requirements set forth for core material in paragraph (u)(7)(ii) of this section.

(7) *Independent buoyancy units.* (i) Buoyancy units shall be securely fastened in such a manner that they may be temporarily removed for inspection purpose. Fastenings shall not pierce the buoyancy units.

(ii) The materials for the buoyancy units shall be as follows:

TABLE 160.035-3(u)(7)

Core	Polystyrene	MIL-P-40619. MIL-P-19644.
	Polyurethane	MIL-P-21929.
Density	2.0 lbs./cu. ft.	Nominal.[1]
Cover, FRP [2]	Woven roving	MIL-C-19663.
	Mat	MIL-M-15617.
	Cloth and tape	MIL-Y-1140.

[1] The density required shall be a nominal 2.01 lbs. cu. ft. This contemplates a range of 1.5 to 2.5 lbs./cu. ft. density provided all of the requirements of a 2.0 bl. pour are met.

[2] The cover is to be reinforced with a polyester or epoxy resin, having a minimum thickness of 0.06. The resin shall be fire retardant in accordance with Military Specification MIL-R-21607.

(iii) The buoyancy units shall have a nameplate attached in such a location as to be visible from within the boat.

(iv) The nameplate shall be made of a noncorrosive metal or of suitable plastic, attached in a permanent manner and contain the following information:

Lifeboat Buoyancy Unit or Tank

(Type or Model)

Type of Buoyancy Material

Cu. Ft. —— Weight —— Date ————
U.S.C.G. OCMI
———————————— —————

Name and address of the manufacturer.

(v) The volume of buoyancy units required shall be determined in accordance with the method set forth for buoyancy tanks in § 160.035-11(b)(2).

(8) *Built-in buoyancy tanks.* (i) A bolted inspection plate shall be provided in such a location that the tank will be accessible for inspection and repair.

(ii) The tops and sides of all built-in buoyancy tanks shall not be less than 14 USSG, except that 16 USSG may be used at the ends if severe forming is necessary. All bulkheads of built-in buoyancy tanks shall be not less than 16 USSG.

(iii) Each built-in buoyancy tank shall be filled with buoyancy material. The amount of material required shall be determined by the flooding test in accordance with § 160.035-11(b)(2). The buoyancy materials used shall meet the requirements set forth for core materials in paragraph (u)(7)(ii) of this section.

(v) *Equipment stowage.* (1) Provision lockers, water tanks, and special equipment lockers shall be watertight and so designed and located as to fit under the side benches, end benches, or footings without projecting into the accommodation spaces of the lifeboat. In special cases, stowage under the thwarts will be permitted. Standard ¼-inch pipe size testing nipples shall be fitted to all such lockers or tanks.

(2) Water tanks shall be constructed of at least 18 USSG material. An opening with a dogged type cover shall be provided for removal of water cans. This opening shall be at least 7 inches in diameter, but in any case shall be of sufficient size that all water cans can be removed. In addition, built-in water tanks shall have an opening at least 13 inches in diameter with a bolted cover for the purpose of inspection and maintenance. A 2-inch diameter fill cap shall be installed for the purpose of storing rain water. A standard ¼-

inch pipe size drainage nipple with hexagonal cap shall be fitted in the bottom of the tank in an accessible location and may be used for air testing the water tank.

(w) *Grab rails.* (1) Grab rails shall be substantially attached to each lifeboat below the turn of the bilge and extend approximately one-half of the length of the lifeboat on each side. The ends of the grab rails shall be faired to prevent fouling and all connections of the rails to the lifeboat shall be made by riveting the palms of the brackets to a small plate and riveting the plate to the shell. To prevent rupture of the shell if the grab rail is carried away, more rivets shall be used in attaching the plate to the shell than in fastening the bracket to the plate. The clearance between the grab rail pipe and the hull shall be at least 1½ inches. The connections of the rails to a fibrous glass reinforced plastic lifeboat hull, will be given special consideration.

(x) *Hand rails.* (1) All lifeboats intended for use in ocean and coastwise service shall be fitted with hand rails approximately 18 inches in length, constructed and attached to the lifeboat in the same manner as the grab rails required by paragraph (w) of this section. The clearance between the hand rail pipe and the hull shall be at least 1½ inches. The hand rails shall be located approximately parallel to and at both ends of the grab rails and spaced midway between the grab rail and the gunwale and midway between the grab rail and the keel on both sides of the lifeboat provided that, when the distance from grab rail to gunwale or to the keel exceeds 4 feet, two hand rails shall be fitted so as to provide equal spacing. In no case shall the hand rails project beyond the widest part of the boat. Recessed hand rails or other alternate arrangements will be given consideration.

(46 U.S.C. 375, 416; 49 U.S.C. 1655(b); 49 CFR 1.4(b), and 1.46)

[CGFR 65-9, 30 FR 11467, Sept. 8, 1965, as amended by CGD 72-133R, 37 FR 17039, Aug. 24, 1972; CGD 75-186, 41 FR 10437, Mar. 11, 1976]

§ 160.035-4 Construction of steel hand-propelled lifeboats.

(a) A hand-propelled lifeboat shall comply with all the requirements for an oar-propelled lifeboat, and in addition shall have sufficient additional buoyancy to compensate for the weight of the hand-propelling gear.

(b) The hand-propelling gear shall be of an approved type and shall be substantially constructed and securely fitted in the lifeboat. The design shall be such that the lifeboat may be readily maneuvered from the ship's side after being launched and steerage way maintained under adverse weather conditions. Provisions shall be made for going astern. The hand-propelling gear shall propel the lifeboat with only a normal amount of effort while maintaining an average speed of not less than 3 knots over a measured course of not less than 1,000 feet.

(c) The hand-propelling gear shall be so designed that it may be operated by persons untrained in its use, and shall be operable when the boat is flooded.

(d) For construction of Hand-Propelling Gear, See Subpart 160.034.

§ 160.035-5 Construction of steel motor-propelled lifeboats with and without radio cabin.

(a) *General provisions applicable to all motor-propelled lifeboats.* (1) A motor-propelled lifeboat, carried as part of the lifesaving equipment of a vessel, whether required or not, shall comply with all the requirements for an oar-propelled lifeboat, and in addition, shall have sufficient additional buoyancy to compensate for the weight of the engine and other equipment.

(2) The engine shall be enclosed in a suitable engine box which shall be watertight with the exception of the top which may be weathertight. If the engine box is made of material other than steel or aluminum, such as fibrous glass reinforced plastic, it shall be made of fire retardant material. The top of the engine box shall be fitted with a screwdown mushroom vent. The engine box shall be fitted with a suitable drain. An engine starting instruction plate shall be perma-

nently attached to the engine box. There shall be ample space between the engine and the engine box to permit proper maintenance and removal of engine accessories when necessary. If the internal arrangements of the engine in the engine box do not permit this, then suitable watertight hand-hole plates shall be installed in the vicinity of these accessories. The location of these plates and the accessibility to the accessories shall be to the satisfaction of the marine inspector. The marine inspector may require the removal of any accessory through these hand-hole plates that he may deem necessary to establish that it is of proper size and location.

(3) Fuel tanks must be constructed of steel, fibrous glass reinforced plastic or other approved equivalent. Fuel tanks must be adequately supported and securely fastened inside the lifeboat to prevent any movement. Fuel tanks must have no openings in the bottom, sides or ends. Openings for fill, vent and feed pipes must be on the top surface of the tanks. The vent size for tanks of 50 gallons or less must not be less than ¼-inch O.D. tubing. Vents for larger tanks will be given special consideration. The access openings in the thwarts for the fill tank cap must have a flush cover or the top of the cap must be flush with the top of the thwart. Fuel feed pipes must be provided with a shutoff valve at the tank, where it is readily accessible and its location marked. Tanks must be tested by a static head above the tank top of ten feet of water without showing leakage or permanent deformation. A graduated measure stick or other means must be provided to determine the amount of the fuel in the tank.

(i) Steel diesel oil fuel tanks shall have a thickness of not less than 12 USSG and shall not be galvanized on the inside; however, the outside of such tanks shall be so treated as to to obtain a corrosion resistance approximately equivalent to hot-dip galvanizing. Swash plates shall be fitted in tanks over 30 inches in length.

(ii) Fibrous glass reinforced plastic diesel oil fuel tanks shall have a thickness of not less than 0.187 inch. The resins used shall be of a fire retardant type and shall qualify under military specification MIL-R-21607. The mechanical properties of the tank shall not be less than Grade No. 4 of military specification MIL-P-17549. Mat, woven roving and 1000th cloth shall be used. Tank laminates shall not be constructed exclusively with fibrous glass fabrics. An increment of random oriented, chopped fibrous glass reinforcement is deemed necessary to prevent porosity. An ounce and a half per square foot is considered minimum. Inclusion of fabrics in low pressure laminates are recommended to impart satisfactory containment, strength, and rigidity. For maximum strength, tank surfaces should be cambered and curved wherein practical. Fittings shall be made of nonferrous metal and securely bonded to the tank with epoxy resin. A fibrous glass reinforced plate or boss of the same thickness as the tank proper and 1½ times the outside dimensions of the fitting shall be used to strengthen the openings for fuel, fill and vent lines. Tanks shall be constructed of a minimum possible number of sections. Where two parts are joined there shall be a minimum of 2-inch overlap. Tanks exceeding 18 inches in any horizontal dimension shall be fitted with vertical baffle plates at intervals not exceeding 18 inches. Baffle plate flanges shall be integral and shall be of the same strength and stiffness as the tank wall. Flanges shall be bonded in place with mat and fabric. A suitable striking plate shall be installed at the bottom of the fuel measurement and fill pipe line. The laminate may be increased in thickness, in the way of the fill pipe. The cover of the fuel tank shall be through bolted as well as bonded. All fuel tanks shall bear legible, permanent labels, conveniently located for visual inspection, signifying full compliance with these specifications and including the following:

(*a*) Manufacturer's name and address.

(*b*) Date of construction and the inspector's initials.

(*c*) Wall thickness (in decimals of one inch) and capacity U.S. gallons.

(*d*) Material of construction: Polyester—Glass.

(4) Propeller shafting shall be of bronze or other suitable corrosion re-

sistant materials. Fittings, pipes, connections, etc., shall be of high standard and good workmanship, and installed in accordance with good marine practice. The exhaust manifold shall be suitably insulated.

(5) All engines shall be permanently installed and shall be equipped with an efficient cranking system. This system shall be one that can be operated by hand, such as a hand cranking, hydraulic cranking, or inertia cranking system, acceptable to the Commandant. If an electric cranking system consisting of an electric starter motor, generator and batteries are fitted, it shall be in addition to the required acceptable cranking system, the battery or batteries shall be installed within the watertight engine box. The battery box shall be so constructed as to retain the battery in position when the lifeboat is in a seaway. The battery box shall be 1 inch longer and 1 inch wider than the battery and shall be lined with 4-pound lead flashed up 3 inches on the sides and ends. The battery box may be made of fibrous glass reinforced plastic using a fire-retardant epoxy resin. This type of battery box will not be required to be lead lined.

(i) *Engines.* The engine shall be a reliable, marine, compression-ignition type and shall be capable of propelling the fully equipped and loaded lifeboat at a sustained speed of not less than 6 knots through smooth water over a measured course. Provision shall be made for going astern. Sufficient fuel for 24 hours continuous operation at 6 knots shall be provided. The engine used in approved lifeboats shall be capable of being started without the use of starting aids at a temperature of 20° F., by the use of an acceptable cranking system. If water cooled, the engine shall be equipped with a closed fresh water cooling system. This system shall be cooled by a secondary medium, such as a water cooled heat exchanger.

(ii) The hydraulic cranking system shall be a self-contained system which will provide the required cranking forces and engine r.p.m. as recommended by the engine manufacturer. The capacity of the hydraulic cranking system shall provide not less than six cranking cycles. Each cranking cycle shall provide the necessary number of revolutions at the required r.p.m. to the engine to meet the requirements of carrying its full rated load within twenty seconds after cranking is initiated with intake air and hydraulic cranking system at 20° F. Capacity of the hydraulic cranking system sufficient for three cranking cycles under the above conditions, shall be held in reserve and arranged so that the operation of a single control by one person will isolate the discharged or initially used part of the system and permit the reserve capacity to be employed. The installation of an engine-driven pump is recommended but is not required. The hydraulic cranking shall meet the requirements prescribed in 46 CFR 58.30 and 46 CFR 61.10-5 of Subchapter F, Marine Engineering Regulations. The hydraulic system when used in lifeboats as engine cranking systems shall be leak-tested at its operating pressure after installation.

(6) The following tools to perform emergency repairs and ordinary servicing shall be provided:

One 12-ounce ball peen hammer.
One screwdriver with 6-inch blade.
One pair of 8-inch slip-joint pliers.
One 8-inch adjustable end wrench.
One 12-inch adjustable end wrench.
One Phillips or cross-head screwdriver with a 6-inch blade.

(b) *Steel motor-propelled lifeboats without radio cabin or searchlight (Class 1).* (1) The engine shall be a reliable marine type and shall be in accordance with paragraph (a)(5)(i) of this section. If a starting battery is supplied, the engine shall be fitted with a marine type generator or alternator insulated as required by AIEE rules for marine service capable of charging the starting batteries. The battery box shall be in accordance with paragraph (a)(5) of this section.

(c) *Steel motor-propelled lifeboats without radio cabin but with searchlight (Class 2).* (1) The engine shall be of a reliable marine type and shall be in accordance with paragraph (a)(5)(i) of this section. The lifeboat shall be equipped with a searchlight constructed in accordance with Subpart 161.006

of this Subchapter Q (Specifications). The engine shall be fitted with a marine type generator or alternator insulated as required by AIEE rules for marine service capable of charging the batteries used for the searchlight as well as the starting batteries, if fitted. The battery box shall be in accordance with paragraph (a)(5) of this section.

(d) *Steel motor-propelled lifeboats with radio cabin and searchlight* (*Class 3*). (1) The engine shall be a reliable, marine type and shall be in accordance with paragraph (a)(5)(i) of this section. The engine shall be fitted with a marine type generator or alternator insulated as required by AIEE rules for marine service, capable of charging the batteries used for the radio and searchlight as well as the starting battery, if fitted.

(2) The radio and source of power for the radio and the searchlight shall be housed and protected from the elements by a suitable radio cabin. The entire installation shall comply with the requirements of the Federal Communications Commission, Rules Governing Stations on Shipboard in the Maritime Services. The radio cabin shall be of a size to contain the radio and source of power for the radio and searchlight, and the operator of the equipment. The top and sides of the radio cabin shall be watertight with the exception of the door which need not be watertight but shall be at least weathertight. The installation of the radio cabin shall take into consideration the concentration of weight in this area.

(3) The searchlight shall be of an approved type constructed in accordance with specification Subpart 161.006 of this subchapter and shall be securely mounted on top of the radio cabin.

(4) The batteries shall be installed in a box securely fastened inside the radio cabin. The battery box shall be in accordance with paragraph (a)(5) of this section.

[CGFR 65-9, 30 FR 11467, Sept. 8, 1965, as amended by CGD 72-133R, 37 FR 17039, Aug. 24, 1972; CGD 73-116R, 39 FR 12747, Apr. 8, 1974]

§ 160.035-6 Construction of aluminum oar-, hand-, and motor-propelled lifeboats.

(a) *General.* Aluminum lifeboats shall comply with the general requirements for the construction and arrangement of steel lifeboats unless otherwise specified.

(b) *Specifications.* The following specifications and schedules of lifeboat material, including Tables 160.035-6, and 160.035-6(d)(1) shall be complied with unless other arrangements in matters of construction details, design, and strength equivalent in safety and efficiency are approved by the Commandant.

80-162 O—82——10

TABLE 160.035-6—ALUMINUM LIFEBOATS

Length of boat not over (feet)	Bar keel, stem and sternpost (inches)	Gunwales [1]		Shell plating (Brown and Sharpe gage) [2]											
				Independent air tanks				Built-in-air tanks							
				5052-H32		6061-T6		5052-H32				6061-T6			
	5086-H112/ 6061-T6	Angle bar (inches) 5086-H112/6061-T6	Flanged flat bar (inches) 5086-H112/ 6061-T6	Side	Bottom	Side	Bottom	Side	Bottom	Inner shell	Bulk-heads	Side	Bottom	Inner shell	Bulk-heads
12.0	2¾x¾	2¼x2x5⁄16	4x5⁄16	14	14	14	14	14	14	14	14	14	14	15	15
14.0	2¾x¾	2¼x2x5⁄16	4x5⁄16	14	14	14	14	14	14	14	14	14	14	15	15
16.0	2¾x¾	2½x2¼x5⁄16	4½x5⁄16	14	14	14	14	14	14	14	14	14	14	15	15
18.0	3x¾	2½x2¼x5⁄16	4½x5⁄16	14	14	14	14	14	14	14	14	14	14	15	15
20.0	3x1	2¾x2½x5⁄16	5x5⁄16	13	13	13	13	13	13	14	14	13	13	14	14
22.0	3x1	2¾x2½x5⁄16	5x5⁄16	12	12	12	12	13	12	14	14	13	13	14	14
24.0	3¼x1	2¾x2½x⅜	5x⅜	11	11	11	11	11	11	13	13	12	12	14	14
26.0	3½x1	2¾x2½x⅜	5x⅜	10	9	11	10	11	10	12	12	11	11	13	13
28.0	3¾x1	2¾x2½x⅜	5x⅜	9	8	10	9	10	9	12	12	11	10	13	13
30.0	4x1	3x2¾x⅜	5½x⅜	9	8	9	8	9	8	11	11	10	9	12	12
32.0	4x1	3x2¾x⅜	5½x⅜	8	7	9	8	9	8	11	11	10	9	12	12
34.0	4x1	3x2¾x⅜	5½x⅜	8	7	8	7	8	7	10	10	9	8	11	11
36.0	4x1	3x2¾x⅜	5½x⅜	7	6	8	7	8	7	10	10	9	8	11	11

[1] Extruded shapes having substantially the scantlings of the angle bar gunwale are permitted. Where extruded shapes are used, a nosing as per § 160.035-3(j) is not required provided the extruded shape has at its heel a generously rounded curve.

[2] Brown and Sharpe gage decimal values: 15 gage equals 0.05707, 14 gage equals 0.06408; 13 gage equals 0.07196; 12 gage equals 0.08081; 11 gage equals 0.09074, 10 gage equals 0.1019; 9 gage equals 0.1144; 8 gage equals 0.1285; 7 gage equals 0.1443, and 6 gage equals 0.1620.

(c) *Materials.* (1) Plating for shell, air tanks, etc., shall be as shown in Table 160.035-6.

(d) *Riveting.* (1) Where riveting is employed in the construction of the shell, double riveting shall be used. The centers of the rivets in the row nearest the edge of the sheet shall not be less than 3/8 inch nor more than 1/2 inch from the edge. Rivets shall be staggered with not less than 18 rivets to the foot and shall be countersunk head or button head rivets. The diameter of the rivets shall be not less than that shown in Table 160.035-6(d)(1).

(2) The rivet alloy shall be 6053-T61 for all applications.

(3) Riveting of the shell plating to the keel, stem and sternpost shall be button head rivets, staggered with not less than 12 rivets to the foot. The distance from the edge of the plate to the center of the rivets in the nearest row shall be not less than 1/2 inch nor more than 3/4 inch. Rivets connecting the shell to the gunwale shall be spaced not more than 3 inches on centers. The size of the rivets for connecting the shell plating to the keel, stem, and sternpost and gunwale shall be not less than that shown in Table 160.035-6(d)(1).

(4) The connection of the floors to the shell shall be made by a single row of rivets of a size not less than that shown in Table 160.035-6(d)(1).

TABLE 160.035-6(d)(1)—RIVETING

Length of boats, not over—(feet)	Shell (inch No./ft.)	Shell to keel (inch No./ft.)	Floors	Gunwales (inch No./ft.)
12.0	5/32@18	5/16@12	3/16"@4 per foot or 5/32"@6 per foot	5/16@4
14.0	5/32@18	5/16@12	Do	5/16@4
16.0	5/32@18	5/16@12	Do	5/16@4
18.0	5/32@24	5/16@12	Do	5/16@4
20.0	5/32@24	5/16@12	Do	5/16@4
22.0	5/32@24	5/16@12	Do	5/16@4
24.0	5/32@24	3/8@12	Do	3/8@4
26.0	5/32@24	3/8@12	Do	3/8@4
28.0	5/32@24	3/8@12	Do	3/8@4
30.0	3/16@24	3/8@12	Do	3/8@4
32.0	3/16@24	3/8@12	Do	3/8@4
34.0	3/16@24	3/8@12	Do	3/8@4
36.0	3/16@24	3/8@12	Do	3/8@4

(e) *Welding.* (1) Welding may be substituted for riveting in the following locations: Hoist plate to keel, disengaging gear grace plate to stem and sternpost, rudder attachment fitting to the sternpost, and the propeller shaft stern tube to the sternpost. When using 6061-T6 aluminum, the welded area is to be heat-treated and checked by X-ray to assure a satisfactory weld. When using 5086-H 112 aluminum, the welded area is to be checked by a nondestructive test method such as X-ray, ultrasonic waves or fluorescent materials, to assure a satisfactory weld. Other methods of checking aluminum welds will be given separate consideration. The welding shall be performed by a welder qualified by the U.S. Coast Guard, American Bureau of Shipping, or U.S. Navy Department, and only suitable electrodes shall be used. Details of the joints shall be indicated on the construction drawings submitted for approval.

(f) *Keel, stem and sternpost.* (1) Dimensions shall be not less than those shown in Table 160.035-6.

(g) *Shell plating.* (1) The thickness of the shell plating shall be not less than that shown in Table 160.035-6.

(2) *Doubler plates.* (i) The doubler plates shall be fitted on all lifeboats where the shell is liable to damage, wear, or corrosion from contact with chocks, gripes, etc. Doublers shall be of the same alloy and not less in thickness than the bottom plating. When the doublers are installed, they shall not be less than 6 inches in width.

(ii) The doublers shall be fastened to the shell plating with the same rivets as required for the shell plating and they shall be staggered with no less than 18 rivets per foot around all edges of the doubler plate.

(iii) Prior to riveting, the complete surface between the shell plating and the doublers shall be treated with suitable insulating compounds. After riveting the faying joints shall be caulked.

(iv) All riveted seams and butt laps, laps of plating on the keel, gunwale, stem and sternpost, shall be made over boundary bar tape such as: P.A.W. tape, Trantex V-20 vinyl tape, EC-1202 Butyl rubber tape, Alumilastic or suitable equivalent nonabsorbing materials. In general the insulating tape should be 1¼ to 1½ inches in width. Under no circumstances should red lead be applied nor should an absorbent felt be used as tape in the riveted joint whether or not it is saturated with red lead.

(h) *Gunwales.* (1) Dimensions of angular gunwales shall be not less than that shown in Table 160.035-6.

(2) Flanged plates made from flat bars, dimensions of which shall not be less than that shown in Table 160.035-6, may be substituted for angular gunwales.

(i) *Dissimilar metals.* (1) Where in the construction of aluminum lifeboats the use of dissimilar metals are employed such as, the installation of the mechanical disengaging gear, hand propelling gear, or engine, suitable insulation between the aluminum and these metals shall be used. Porous or absorbent materials shall not be used as insulating materials. Only nonporous materials such as plastics, rubber or neoprene base compounds, or micarta shall be used. Other suitable material will be given separate consideration. Fasteners used in joining dissimilar metals together shall be of the type that will minimize corrosion.

§ 160.035-7 Construction of wood oar-, hand-, and motor-propelled lifeboats.

(a) Wooden lifeboats are prohibited on tank vessels. No specification requirements for new construction are in effect at this time.

§ 160.035-8 Construction of fibrous glass reinforced plastic (F.R.P.), oar-, hand-, and motor-propelled lifeboats.

(a) *General requirements.* (1) Plastic lifeboats shall comply with the general requirements for the construction and arrangement of steel lifeboats, except that unless otherwise specified, materials, scantlings, methods of construction, fastenings, methods of attachment of component parts, and other specific construction details may be varied by the builder in order to produce a structurally sound boat meeting in every respect recognized standards of first class construction and one which will satisfactorily meet the performance requirements set forth in this subpart.

(2) Fibrous glass reinforced plastic lifeboats may be of the following categories of hull construction:

A—Single piece, outer hull construction.
B—Two piece, outer hull construction.
C—Single piece, inner hull construction.
D—Two piece, inner hull construction.
E—Multi-piece, inner hull construction.

(b) *Specific requirements*—(1) *Resin.* The resin used shall be of the fire retardant, nonair inhibited-type conforming to Class A of Military Specification MIL-R-21607 and Grade A, Class O of Military Specification MIL-R-7575, including tests after 1 year's weathering. In addition, the test panels shall be tested for continued conformance with Military Specification MIL-R-21607. All tests, including weathering of samples, shall be accomplished by an independent laboratory. Complete certification by the independent laboratory with test data shall be submitted to Coast Guard (MMT-3) for acceptance. Class A resin shall be fire retardant without additives. Class B resins will be given consideration upon request. Class B resin shall be fire retardant with additives and shall meet the same test requirements as that for Class A resins. When Class B resin is used for the prototype lifeboat, additives for fire retardancy shall not be used in order to obtain a translucent laminate for inspection purposes. This prototype test lifeboat will not be stamped approved, nor will it be acceptable for merchant vessels. Whichever class of resin the manufacturer decides to use for his prototype lifeboat, shall be used in his production lifeboats. A note to this effect shall be included in his specifications and drawings for this particular size and type lifeboat.

(2) *Glass reinforcement.* The glass reinforcement used shall have good laminated wet strength retention and shall meet the appropriate military specification stated in this paragraph. Glass cloth shall meet Military Specification MIL-Y-1140, Class C, form 4, No. 1000-150. Woven roving shall conform to Military Specification MIL-C-19663, Style 605-308 or Style 605-604. Other glass materials equivalent in strength, design, wet out, and efficiency will be given consideration upon request.

(3) *Laminate.* All exposed surfaces of the finished laminate shall present a smooth finish, and there shall be no protruding surface fibers, open voids, pits, cracks, bubbles or blisters. The laminate shall be essentially free from resin-starved or overimpregnated areas, and no foreign matter shall remain in the finished laminate. The entire laminate shall be fully cured and free of tackiness, and shall show no tendency to delaminate, peel, or craze in any overlay. The laminate shall not be released from the mold until a Barcol hardness reading of not less than 40-55 is obtained from at least 10 places on the nongel coated surface, including all interior inner and outer hull surfaces and built-in lockers. The mechanical properties of the laminate shall meet the requirements for a Grade 3 laminate as specified in Table I of Military Specification MIL-P-17549. Other grades will be given consideration on specific request. For the prototype boat of each design made by each manufacturer, the layup shall be made of unpigmented clear resins so that all details of construction will be visible for inspection and test panels representative of each prototype layup shall be tested in accordance with MIL-P-17549.

(4) *Weights of F.R.P. lifeboats.* (i) The variations in weight between the fibrous glass reinforced plastic in the prototype F.R.P. lifeboat and the fibrous glass reinforced plastic in the production F.R.P. lifeboat shall be within 5 percent. This weight shall be for the F.R.P. sections only and shall not include the weight of any hardware or equipment.

(ii) When assembling two similar sections as indicated by categories B and D of paragraph (a)(2) of this section, the weights of the matching F.R.P. pieces shall be within 5 percent of each other.

(iii) The recorded weights of the items indicated in paragraphs (b)(4) (i) and (ii) of this section shall be kept by the manufacturer, with each boat listed by size, type, and serial number.

[CGFR 65-9, 30 FR 11467, Sept. 8, 1965, as amended by CGD 72-133R, 37 FR 17039, Aug. 24, 1972]

§ 160.035-9 Cubic capacity of lifeboats.

(a) *Definitions.* The following definitions apply to the measurement of a lifeboat to determine its cubic capacity.

(1) *Length (L).* The length is the distance in feet from the inside of the plating or planking at the stem to the corresponding position at the stern. In the case of a boat with a square stern, the after terminus is the inside of the transom.

(2) *Breadth (B).* The breadth is the distance in feet over the plating or planking at the point where the breadth of the boat is greatest.

(3) *Depth (D).* The depth is the distance in feet amidships inside the plating from the top of the keel to the level of the gunwale. The depth used for calculating purposes shall not exceed 45 percent of the breadth.

(4) *Sheer.* Lifeboats shall have a sheer at each end at least equal to 4 percent of the length, and a sheer at the quarter points of at least 1 percent of the length. If less sheer is provided, the depth used to determine the cubic capacity shall be assumed to be reduced so as to achieve this minimum sheer.

(b) *Formula.* The cubic capacity shall be determined by the following formula:

$$L \times B \times D \times 0.64$$

In the case of lifeboats with unusual proportions, the Commandant may require that the cubic capacity be calculated by exact measurements from which the exact seating capacity may be determined.

(c) *Hand-propelled lifeboat.* The cubic capacity of a hand-propelled lifeboat shall be determined in the same manner as an oar-propelled lifeboat and then deducting from the gross volume, a volume equal to that occupied by the hand-propelling gear.

(d) *Motor-propelled lifeboat.* The cubic capacity of a motor-propelled lifeboat shall be determined in the same manner as an oar-propelled lifeboat and then deducting from the gross volume, a volume equal to the engine box and accessories, and when carried, the radio cabin, searchlight, and their accessories. The volume of such equipment extending above the sheer line need not be deducted.

§ 160.035-10 Number of persons allowed in lifeboats.

(a) The maximum number of persons for which the lifeboat may be rated is determined as noted in paragraphs (a) (1), (2), and (3) of this section. The smallest number obtained is the number to be used.

(1) The number of persons which a lifeboat shall be permitted to accommodate shall be equal to the greatest whole number obtained by dividing the capacity in cubic feet by the factor shown in Table 160.035-10(a). The net cubic capacity shall be determined by § 160.035-9(b).

TABLE 160.035-10(a)

Length in feet—		Factor
Of—	But less than—	
	18	14
18	20	13
20	22	12
22	24	11
24	Or over	10

(2) The number of persons permitted in the lifeboat shall not exceed the number for which seating space is provided as determined by drawing figures to scale of a size as noted in Figure 160.035-10(a)(2) on an arrangement plan of the lifeboat.

(3) The number of persons permitted in the lifeboat shall not exceed the number of persons wearing life preservers which can be seated in the lifeboat without interfering with the use of the oars or the operation of other propulsion equipment.

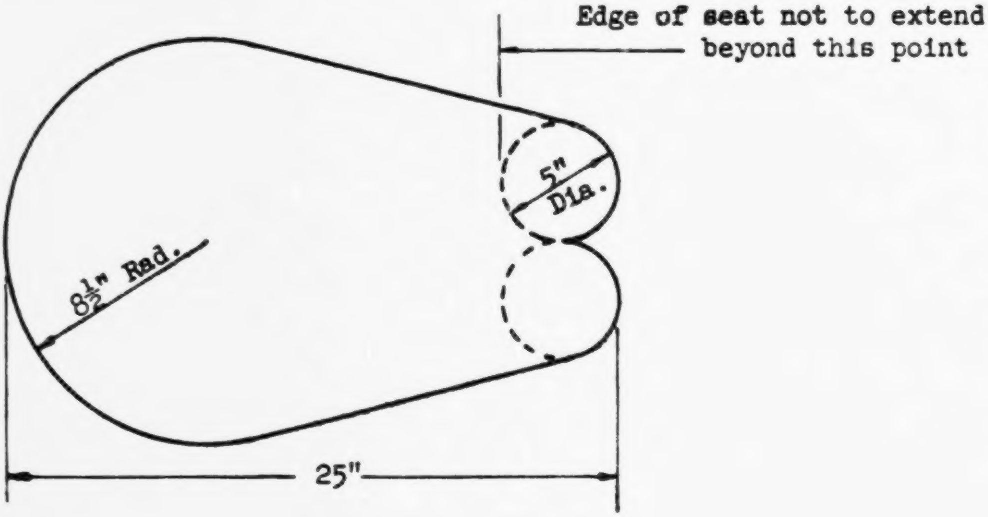


FIGURE 160.035-10(a)(2)

§ 160.035-11 Inspection and testing of lifeboats.

(a) *General.* Coast Guard marine inspectors shall be admitted to any place in the builder's factory where work is done on these lifeboats or component materials or parts. Lifeboats shall be inspected during the course of construction to determine that the arrangements and materials entering into the construction are in accordance with approved plans, and to insure that the workmanship is of good quality. Samples of materials entering into construction may be taken by the marine inspectors for such tests as may be deemed necessary at any time there is any question as to suitability or adequacy of any material or arrangement.

(b) *Preapproval tests.* Before approval is granted to any design of lifeboat, the following tests shall be made by a marine inspector:

(1) *Strength test.* The light lifeboat shall be suspended by shackles at the bow and stern, or by means of the releasing gear, and the length, beam, and depth shall be measured. Weights shall then be added to equal the weight of the equipment, food, water, etc., and persons for which the boat is to be approved, and the length, beam, and depth measured. Additional weight shall then be added so that the suspended load is 25 percent greater than the weight of the fully equipped and loaded lifeboat and the measurements repeated. All weights shall then be removed and the measurements rechecked. There shall be no appreciable set as a result of this test.

(2) *Flooding test.* Lifeboats shall be flooded while open to the sea to determine the amount of buoyancy necessary to float the complete boat including releasing gear but with no equipment, provision lockers, water tanks, or fuel tanks aboard. If provision lockers, water tanks, and fuel tanks cannot be removed, they should be flooded or filled to the final waterline. Lifeboats fitted with watertight stowage compartments to accommodate individual drinking water containers shall have these individual containers aboard and placed in the stowage compartments which shall be sealed watertight during the flooding test. Ballast of equivalent weight and density should be substituted for the motor, shaft, propeller, radio battery, searchlight, etc., if they are to be installed.

(i) *Boats with independent buoyancy tanks or buoyancy units.* The estimated amount of buoyancy to just float the boat in this condition should be fitted symmetrically aboard the lifeboat, and then the boat flooded. If the tops of the gunwales at their lowest point do not clear the surface of the water, the buoyancy shall be increased as necessary. An additional volume of buoyancy, or buoyancy units, equal to at least one-tenth the cubic capacity of the lifeboat shall be provided.

(ii) *Boats with built-in buoyancy compartments.* When flood testing lifeboats with built-in buoyancy compartments weights shall be placed in the bottom of the lifeboat to counteract the buoyancy provided for the persons to be carried. The amount of weight required per person carried shall be as follows:

Materials	*Weight per person (pounds)*
Iron or steel	72
Lead	69
Concrete	110

Other impervious material may be used if more convenient. The weight per person required is determined from the formula

$$W = 63d \div d - 63$$

where d is the density of material in pounds per cubic foot (Sandbags should not be used for this purpose inasmuch as their weight under water is not readily predictable.) If the lifeboat weighted as above does not float with the gunwale at the lowest point just clear of the surface of the water, unit air tanks should be slipped beneath the thwarts until the gunwales do clear the surface of the water. The additional air tankage required shall be incorporated in the design of the lifeboat.

(3) *Seating capacity test.* The lifeboat shall be fully loaded with equipment, and in this condition the number of persons for which the lifeboat is to be approved shall be seated, in accordance with the seating plan re-

quired in § 160.035-14(a). All persons shall wear an approved life preserver and it shall be demonstrated by actual test that there is sufficient room to row the boat without interference.

(4) *Freeboard test.* Freeboards shall be measured to the low point of the sheer with the lifeboat in light condition with neither equipment nor persons aboard, and in the loaded condition with full equipment and persons aboard.

(5) *Stability test.* Upon the conclusion of the seating test, all persons on one side of the centerline shall disembark. The remaining people should sit upright and not move from their original positions. (Not less than one-half in total number of persons should remain in the lifeboat.) Freeboard to the low point of sheer shall then be measured. This freeboard should, in general, be not less than 10 percent of the depth of the lifeboat.

(c) Motor-propelled lifeboats must pass the tests as required for an oar-propelled lifeboat in § 160.035-3. In addition, speed tests over a measured course and fuel consumption tests on a time basis shall be made to determine that the fully loaded motor-propelled lifeboats can maintain a speed of 6 knots for all classes of motor-propelled lifeboats, and that for each class of motor-propelled lifeboat its fuel tanks carry sufficient fuel for at least 24 hours at 6 knots. A 4-hour endurance trial shall be conducted with the fully loaded lifeboat at the RPM attained in the speed test in order to insure that there is no overheating, undue vibration, or other condition which would warrant the belief that the lifeboat could not maintain its proper speed for 24 hours. The time consumed in conducting the speed and fuel consumption tests may be counted toward the 4-hour endurance test. It shall be demonstrated that all engines installed in motor lifeboats can be started by the acceptable cranking system installed with no previous warming up period.

(d) Hand-propelled lifeboats shall be subjected to the same tests as required for an oar-propelled lifeboat. In addition, a test shall be made to assure that the lifeboat can be satisfactorily maneuvered with the hand-propelling gear. A speed of at least three knots shall be achieved in both light and load condition over a measured course of not less than 1,000 feet.

[CGFR 65-9, 30 FR 11467, Sept. 8, 1965, as amended by CGD 72-133R, 37 FR 17040, Aug. 24, 1972]

§ 160.035-12 Additional preapproval tests required for F.R.P. lifeboats.

(a) *General.* These tests are required in addition to the preapproval tests required for steel lifeboats in § 160.035-11. The prototype boat of each size or design submitted will be required to perform satisfactorily in the following tests which will be made in the presence of a marine inspector.

(b) *Strength test.* The following tests described in this paragraph are in lieu of the strength test in § 160.035-11(b)(1):

(1) *Suspension tests.* The light lifeboat shall be suspended freely from the releasing gear and the length, beam, and depth measured. Weights shall then be added to equal the weight of the equipment, food, water, and persons to be carried (see § 160.035-11(b)(2)(ii)), and the length, beam, and depth measured. Additional weights shall then be added so that the suspended load is 25, 50, 75, and 100 percent greater than the weight of the fully equipped and loaded lifeboat and the measurements taken at each 25 percent increments. (Water may be used for all or any portion of the weight if desired.) All weights shall then be removed and final measurements taken. There shall be no fractures or other signs of excessive stress and no appreciable set as a result of this test.

(2) *Chock test.* The light lifeboat shall be placed on blocks located under the keel at the quarter points and measurements of length, beam, and depth taken. The boat shall be flooded with water equal to the weight of all equipment, food, water, and persons to be carried and measurements of length, beam, and depth taken again. Additional measurements of 25, 50, 75, and 100 percent of the weight of the fully equipped and loaded lifeboat shall be added and the measurements taken at 25 percent incre-

ments. If the boat becomes full of water before 100 percent overload is reached, no additional weight need be added, and the last deflection measurements with the boat under load shall be taken at this point. The boat shall be drained and final measurements taken. There shall be no fractures or other signs of excessive stress and no appreciable set as a result of this test.

(3) *Swing test.* The boat shall be loaded with weights equal to the weight of all equipment, food, water and persons to be carried. It shall then be suspended by the releasing gear with falls 20 feet in length so arranged that when hanging freely the gunwale on one side of the boat is approximately 2 inches from a stationary concrete or steel wall or other structure of similar construction and rigidity. The boat shall then be hauled outboard a horizontal distance of 8 feet from its original position. From this point, the boat shall be allowed to freely swing inboard and strike the wall along one side. There shall be no damage which would render the boat unserviceable.

(4) *Drop test.* The boat shall be loaded with weights equal to the full weight of all equipment, food, water and persons to be carried. The boat shall then be suspended freely from the releasing gear and shall be dropped in a free fall into the water from a height of 10 feet. There shall be no damage which would render the boat unserviceable.

(5) *Thwart test.* A 200-pound sand bag shall be dropped from a height of 6 feet on the center of each thwart span. The thwarts shall not fracture or otherwise be rendered unserviceable.

(6) *Towing test.* With a towline rigged around the forward thwart in the same manner as the sea painter is normally rigged, the fully loaded lifeboat shall be towed at least 1,000 yards at a speed of not less than 5 knots. The boat shall exhibit satisfactory towing characteristics and there shall be no appreciable damage to the thwart.

(7) *Tanks and lockers.* Equipment tanks and watertight lockers shall be tested with not less than 1.0 p.s.i. of air pressure both before and after the tests described in paragraphs (b)(1) through (6) of this section.

§ 160.035-13 Testing and inspection after approval.

(a) *General.* After the design of a lifeboat has been approved, subsequent lifeboats of the same design shall be individually inspected and tested as noted in § 160.035-11(a) for metal lifeboats and paragraph (b) of this section for FRP. lifeboats. In addition, motors and band-propelling gear when installed shall be operated in the "ahead", "neutral", and "astern" positions. If mechanical disengaging apparatus is fitted, it shall be tested by suspending the lifeboat loaded with deadweight equivalent to the number of persons allowed in the lifeboat (165 pounds per person) together with the weight of the equipment, plus 10 percent of the total load, including the weight of the lifeboat. The release lever shall then be thrown over with this load suspended until the lifeboat is released. The apparatus shall be capable of being operated freely by one man, without the use of aids or undue force to the satisfaction of the marine inspector. (This test may be conducted ashore by suspending the lifeboat just clear of the ground.)

(b) *Additional production inspection and tests for FRP. lifeboats*—(1) *Inspection requirements.* Each production model fibrous glass reinforced plastic lifeboat shall as a condition to its being accepted as Coast Guard approved equipment, be examined by a marine inspector at the following stages in its manufacture:

(i) When the major, individual components of the shell and inner hull or buoyancy casing are completed but before they are assembled together. At this stage the marine inspector shall satisfy himself that these components comply with the approved plans and specifications by visual inspection, thickness measurements and comparison of the weights of the components with the weights recorded for the same components in the prototype.

(ii) At the time the internal buoyancy is installed. If block plastic foam is used, it shall be inspected after it has been cut to size and shaped but before it is inserted and covered. The installation shall be completed in the presence of the marine inspector and he shall verify that the required amount is used by weighing the material. If foamed-in-place plastic foam is used, the marine inspector shall be present during the foaming operation. A sample of the foam shall be retained outside the boat and when it sets it shall be used to make a density determination of the material.

(iii) When the boat is completed. At this stage the marine inspector shall check the scantlings of the minor components and the overall compliance with the plans. The manufacturer shall certify that the materials used are in accordance with the approved bill of materials.

(2) *Test requirements.* After the inspections listed in paragraph (b)(1) of this section are completed, the following tests are to be carried out to the satisfaction of the marine inspector:

(i) The boat shall be suspended freely from the releasing gear and the length, breadth and depth measured. The boat shall then be flooded with water equal to 1½ times the weight of the boat, persons, equipment, and provisions and fuel (if motor driven) less the weight of the boat. This is represented by the following formula:

Water added = 1.5 × (empty boat + equipment + provisions + fuel + people) − empty boat

The length, breadth and depth shall be measured in this loaded condition and, again, after the load has been removed. The loaded deflections and the permanent deformations shall not significantly exceed those recorded for the prototype in the pre-approval tests. Also, while flooded, the exterior of the hull shall be examined for leaks or other defects. After the boat is drained, the attachment of the release gear shall be carefully examined.

(ii) All provision tanks shall be tested by a static head above the tank top of 2 feet of water without showing leakage or permanent deformation.

(iii) The plastic fuel tanks shall be tested by a static head above the tank top of 10 feet of water without showing leakage or permanent deformation.

(c) *Marking.* (1) A corrosion resistant nameplate shall be affixed at the bow of each lifeboat on which is stamped the name of the manufacturer, serial number, approval number, dimensions of the lifeboat, cubic capacity, buoyancy capacity, net weight of the boat in Condition A and Condition B, the number of persons for which the lifeboat is approved, together with the Marine Inspection Office identification letters, the date, and the letters U.S.C.G. *Condition A* includes buoyancy and water tanks and provision stowage compartments but no equipment, provisions, water or persons. *Condition B* includes full required provisions and equipment, persons allowed at 10 cubic feet or by seating test whichever is less at 165 pounds and 3 quarts of water (6.25 pounds)—per person.

(46 U.S.C. 375, 416; 49 U.S.C. 1655(b); 49 CFR 1.4(b), and 1.46)

[CGFR 65-9, 30 FR 11467, Sept. 8, 1965, as amended by CGD 72-133R, 37 FR 17040, Aug. 24, 1972; CGD 75-186, 41 FR 10437, Mar. 11, 1976]

§ 160.035–14 Procedure for approval of lifeboats.

(a) Before action is taken on any design of lifeboat, plans covering fully the arrangement and construction of the lifeboat, material specifications, together with a lines drawing, stowage arrangement, seating arrangement, and other details shall be submitted to the Commandant through the Commander of the Coast Guard District in which the lifeboat is built. The plans for approval must be detailed to a degree that the lifeboat can be constructed from the plans submitted.

(b) If the drawings required in paragraph (a) of this section are satisfactory, the manufacturer shall notify the Commander of the Coast Guard District in which the lifeboat is built in writing when fabrication is to commence. A marine inspector will be assigned to witness the construction procedure in accordance with the plans, verify the tests required by § 160.035–11 for metal lifeboats and § 160.035–12 for additional tests required for F.R.P. lifeboats. Also, the manufacturer shall provide the necessary tools and facilities required to conduct the tests. The Coast Guard shall have the right to require such other additional tests as reasonably may be deemed necessary, either with the completed boat or component parts, depending upon the particular construction methods and materials used by the builder, or any unusual conditions or circumstances which may arise during the construction or testing.

(c) At the time that the tests are successfully completed, the manufacturer shall present to the marine inspector four corrected copies of the plans noted in paragraph (a) of this section, including any corrections, changes, or additions which may have been found necessary during construction or testing. If the manufacturer desires more than one set of approved plans, additional copies shall be submitted at that time.

(d) Upon receipt of corrected drawings and satisfactory test reports, the Commandant will issue a certificate of approval. No change shall be made in the design or construction without first receiving permission of the Commandant via the Commander of the Coast Guard District in which the lifeboat is built.

Subpart 160.036—Hand-Held Rocket-Propelled Parachute Red Flare Distress Signals

AUTHORITY: 46 U.S.C. 481, 49 U.S.C. 1655(b)(1), 49 CFR 1.46(b).

SOURCE: CGD 76-048a and 76-048b, 44 FR 73081, Dec. 17, 1979, unless otherwise noted.

§ 160.036-1 Incorporation by reference.

(a) The following is incorporated by reference into this subpart:

(1) "The Universal Color Language" and "The Color Names Dictionary" in *Color: Universal Language and Dictionary of Names,* National Bureau of Standards Special Publication 440, December 1976.

(b) NBS Special Publication 440 may be obtained by ordering from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 (Order by SD Catalog No. C13.10:440).

(c) Approval to incorporate by reference the material listed in this section was obtained from the director of the Federal Register on November 1, 1979. The material is on file in the Federal Register library.

§ 160.036-2 Type.

(a) Handheld rocket-propelled parachute red flare distress signals specified by this subpart shall be of one type which shall consist essentially of a completely self-contained device which can be fired from the hand to provide a rocket-propelled parachute red flare distress signal.

§ 160.036-3 Materials, workmanship, construction and performance requirements.

(a) *Materials.* The materials used in handheld rocket-propelled parachute red flare distress signals shall conform strictly to the specifications and drawings submitted by the manufacturer and approved by the Commandant. In general, all exposed parts shall be corrosion-resistant or properly protected against corrosion.

(b) *Workmanship.* Handheld rocket-propelled parachute red flare distress signals shall be of first class workmanship and shall be free from imperfections of manufacture affecting their appearance or that may affect their serviceability.

(c) *Construction.* The exterior case of the cartridge shall be made of a suitable metal and shall protect against the entrance of moisture. The construction shall be such that the parachute and pyrotechnic candle will be expelled at approximately the maximum altitude reached.

(d) *Performance.* Signals shall meet all of the inspection and test requirements contained in § 160.036-4.

§ 160.036-4 Approval and production tests.

(a) *Approval tests.* The manufacturer must produce a lot of at least 100 signals from which samples must be taken for testing for approval under § 160.036-7. The approval tests are the operational tests and technical tests in paragraphs (c) and (d) of this section. The approval tests must be conducted by an independent laboratory accepted by the Commandant under § 159.010 of this Chapter.

(b) *Production inspections and tests.* Production inspections and tests of each lot of signals produced must be conducted under the procedures in § 159.007 of this Chapter. Signals from a rejected lot must not be represented as meeting this Subpart or as being approved by the Coast Guard. If the manufacturer identifies the cause of the rejection of a lot of signals, the signals in the lot may be reworked by the manufacturer to correct the problem. Samples from the rejected lot must be retested in order to be accepted. Records shall be kept of the reasons for rejection, the reworking performed on the rejected lot, and the results of the second test.

(1) *Lot size.* For the purposes of sampling the production of signals, a lot must consist of not more than 30,000 signals. Lots must be numbered serially by the manufacturer. A new lot must be started with:

(i) Any change in construction details,

(ii) Any changes in sources of raw materials, or

(iii) The start of production on a new production line or on a previously discontinued production line.

(2) *Inspections and tests by the manufacturer.* The manufacturer's quality control procedures must include inspection of materials entering into construction of the signals and inspection of the finished signals, to determine that signals are being produced in accordance with the approved plans. Samples from each lot must be tested in accordance with the operational tests in paragraph (c) of this section.

(3) *Inspections and test by an independent laboratory.* An independent laboratory accepted by the Commandant under § 159.010 of this Chapter must perform or supervise the inspections and tests under paragraph (b)(2) of this section at least 4 times a year, unless the number of lots produced in a year is less than four. The inspections and tests must occur at least once during each quarterly period, unless no lots are produced during this period. If less than four lots are produced, the laboratory must perform or supervise the inspection and testing of each lot. In addition, the laboratory must perform or supervise the technical tests in paragraph (d) of this section at least once for every ten lots of signals produced, except that the number of technical tests must be at least one but not more than four per year. If a lot of signals tested by the independent laboratory is rejected, the laboratory must perform or supervise the inspections and tests of the reworked lot and the next lot of signals produced. The tests of each reworked lot and the next lot produced must not be counted for the purpose of meeting the requirement for the annual number of inspections and tests performed or supervised by the independent laboratory.

(c) *Operational tests.* Each lot of signals must be sampled and tested as follows:

(1) *Sampling procedure and accept/reject criteria.* A sample of signals must be selected at random from the lot. The size of the sample must be the individual sample size in Table 160.036-4(c)(1) corresponding to the lot size. Each signal in the sample is tested as prescribed in the test procedure in paragraph (c)(2) of this section. Each signal that has a defect listed in the table of defects (Table 160.036-4(c)(2)) is assigned a score (failure percent) in accordance with that table. In the case of multiple defects, only the score having the highest numerical value is assigned to that signal. If the sum of all the failure percents (cumulative failure percent) for the number of units in the sample is less than or equal to the accept criterion, the lot is accepted. If this sum is equal to or more than the reject criterion the lot is rejected. If the cumulative failure percent falls between the accept and reject criteria, another sample is selected from the production lot and the operational tests are repeated. The cumulative failure percent of each sample tested is added to that of the previous samples to obtain the cumulative failure percent for all the signals tested (cumulative sample size). Additional samples are tested and the tests repeated until either the accept or reject criterion for the cumulative sample size is met. If any signal in the sample explodes when fired or ignites in a way that could

burn or otherwise injure the person firing it, the lot is rejected without further testing. (This procedure is diagrammed in figure 160.036-4(c)).

(2) *Test procedure.* Each sample signal (specimen) must be tested as follows:

(i) *Conditioning of test specimens—water resistence.* Immerse specimen horizontally with uppermost portion of the signal approximately 25 mm (1 in.) below the surface of the water for a period of 24 hours.

(ii) *Firing and operating characteristics.* Signals shall fire and operate satisfactorily when the manufacturer's directions are followed. The parachute and pyrotechnic candle shall be ejected at approximately the maximum altitude reached by the projectile case. The parachute shall open and properly suspend the pyrotechnic candle without fouling. The pyrotechnic candle shall burn with uniform intensity and without damaging the parachute, shrouds, or leader line.

(iii) *Altitude.* The altitude reached by a signal is considered to be the height at which the parachute and pyrotechnic candle are ejected from the projectile case, as determined by visual observation against an object of known height, such as a tower or balloon, or by triangulation from two or more points of observation, or by other method satisfactory to the Commandant. The altitude reached shall be not less than 150 m (500 ft.).

(iv) *Rate of descent.* The rate of descent of a signal is considered to be the calculated average rate obtained by dividing the altitude by the time of descent to the surface. The rate of descent shall not exceed 4.5 m (15 ft.) per second.

(v) *Burning time.* The burning time of the pyrotechnic candle shall be obtained by stop watch measurement from the time a distinct, sustained flame is emitted until it ceases. The burning time shall be not less than 30 seconds.

TABLE 160.036–4(C)(1).—*Accept and reject criteria for operational test lots*

Lot size	Individual sample size	Sample	Cumulative sample size	Accept [1]	Reject [1]
280 or less	8	First	8	(2)	400
		Second	16	100	500
		Third	24	200	600
		Fourth	32	300	700
		Fifth	40	500	800
		Sixth	48	700	900
		Seventh	56	950	951
281 to 500	13	First	13	0	400
		Second	26	100	600
		Third	39	300	800
		Fourth	52	500	1,000
		Fifth	65	700	1,100
		Sixth	78	1,000	1,200
		Seventh	91	1,350	1,351
501 to 1,200	20	First	20	0	500
		Second	40	300	800
		Third	60	600	1,000
		Fourth	80	800	1,300
		Fifth	100	1,100	1,500
		Sixth	120	1,400	1,700
		Seventh	140	1,850	1,851
1,201 to 3,200	32	First	32	100	700
		Second	64	400	1,000
		Third	96	800	1,300
		Fourth	128	1,200	1,700
		Fifth	160	1,700	2,000
		Sixth	192	2,100	2,300
		Seventh	224	2,550	2,551
More than 3,201	50	First	50	200	900
		Second	100	700	1,400
		Third	150	1,300	1,900
		Fourth	200	1,900	2,500
		Fifth	250	2,500	2,900
		Sixth	300	3,100	3,300
		Seventh	350	3,750	3,751

[1] Cumulative failure percent.

(2) Lot may not be accepted. Next sample must be tested.

TABLE 160.036–4(C)(2)

Kind of defect	Percentage of failure
a. Failure to fire	100
b. Failure to eject projectile contents	100
c. Failure to ignite pyrotechnic candle	100
d. Failure of parachute to open completely	75
e. Complete carrying away or destruction of parachute	75
f. Altitude less than 70 pct of that required	100
g. Altitude less than 70 pct but less than 80 pct of that required	75
h. Altitude at least 80 pct but less than 90 pct of that required	50
i. Altitude at least 90 pct but less than 100 pct of that required	25
j. Average rate of descent greater than four times maximum permitted	100
k. Average rate of descent less than 4 but greater than 3 times maximum permitted	75
l. Average rate of descent less than 3 but greater than 2 times maximum permitted	50

TABLE 160.036-4(c)(2)—Continued

Kind of defect	Percentage of failure
m. Average rate of descent less than twice but greater than maximum permitted	25
n. Burning time less than 70 pct of that required	100
o. Burning time at least 70 pct but less than 80 pct of that required	75
p. Burning time at least 80 pct but less than 90 pct of that required	50
q. Burning time at least 90 pct but less than 100 pct of that required	25

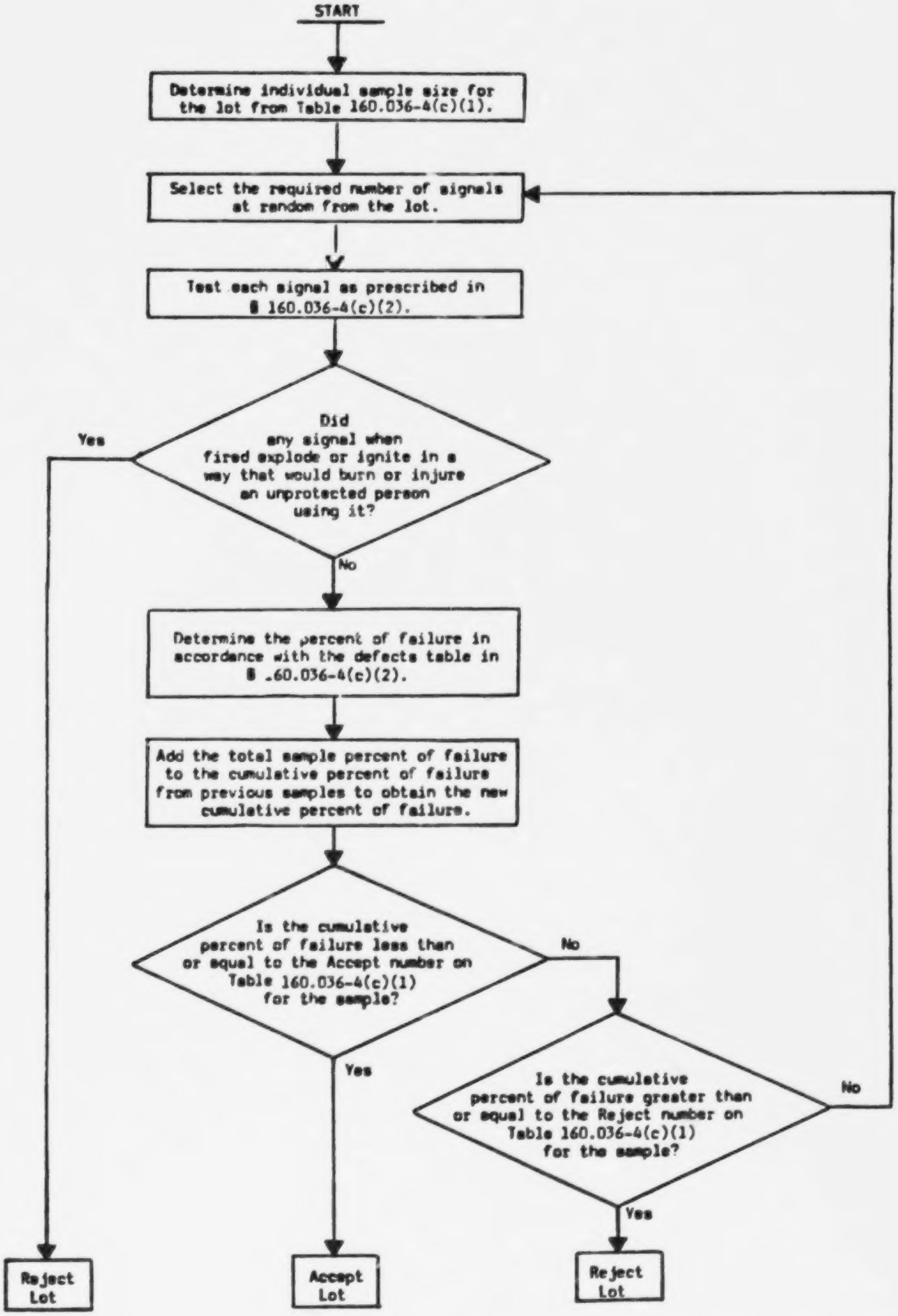

START
Determine individual sample size for the lot from Table 160.036-4(c)(1).
Select the required number of signals at random from the lot.
Test each signal as prescribed in § 160.036-4(c)(2).
Did any signal when fired explode or ignite in a way that would burn or injure an unprotected person using it?
Yes
No
Determine the percent of failure in accordance with the defects table in § .60.036-4(c)(2).
Add the total sample percent of failure to the cumulative percent of failure from previous samples to obtain the new cumulative percent of failure.
Is the cumulative percent of failure less than or equal to the Accept number on Table 160.036-4(c)(1) for the sample?
No
Yes
Is the cumulative percent of failure greater than or equal to the Reject number on Table 160.036-4(c)(1) for the sample?
No
Yes
Reject Lot
Accept Lot
Reject Lot

Figure 160.036-4(c). Operational test procedure.

(d) *Technical tests.* Three signals must be subjected to each of the following tests. Two of the three signals must pass each test in order for the lot of signals to be accepted.

(1) *Luminous intensity.* The luminous intensity of each pyrotechnic candle tested shall be measured by a visual photometer or equivalent photometric device while the specimen is supported in a horizontal position and the photometer is at right angles to the axis of the specimen. Visual luminous intensity readings shall be observed and recorded at approximately 5-second intervals during the burning of the specimen. The minimum photometric distance shall be 3 m (10 ft.). Recording photometers shall have a chart speed of at least 10 cm (4 in.) per minute. The luminous intensity of the specimen shall be computed as the arithmetical average of the readings recorded. The average luminous intensity of a specimen shall be not less than 20,000 candela.

(2) *Elevated temperature, humidity, and storage.* Place specimen in a thermostatically controlled even-temperature oven held at 75° C. with not less than 90 percent relative humidity for 72 hours. Remove specimen and store at room temperature (20° to 25° C.) with approximately 65 percent relative humidity for ten days. If for any reason it is not possible to operate the oven continuously for the 72-hour period, it may be operated at the required temperature and humidity for 8 hours out of each 24 during the 72-hour conditioning period. (Total of 24 hours on and 48 hours off.) The signal shall not ignite or decompose during this conditioning. The signal shall fire and operate satisfactorily following this conditioning.

(3) *Spontaneous ignition.* Place the specimen in a thermostatically controlled even-temperature oven held at 75° C. with not more than 10% relative humidity for 48 consecutive hours. The signal shall not ignite or undergo marked decomposition.

(4) *Chromaticity.* The color of the burning signal must be vivid red as defined by Sections 13 and 14 of the "Color Names Dictionary." Two identical test plates of white cardboard about 30 cm x 60 cm (12″ x 24″) are used. Except for a negligible amount of stray daylight, the first test plate is illuminated by light from the specimen placed at a distance of about 1.5 m (5 ft.). The second test plate is illuminated only by light from an incandescent lamp operated at a color temperature close to 2,848° K at a distance of about 30 cm (1 ft.). The first plate is viewed directly, the second through combinations of Lovibond red, yellow, and blue glasses selected so as to approximate a chromaticity match. By separating the test plates by a wide unilluminated area (subtending at the observer about 45°), it is possible to make accurate determinations of chromaticity in terms of the 1931 CIE Standard Observer and Coordinate System, in spite of fluctuations in luminous intensity of the specimen by factors as high as 2 or 3. The CIE coordinates are converted to the Munsell notation which is cross-referenced to the color name in Section 13 of the "Color Names Dictionary" (see the discussion in Section 10 of "The Universal Color Language").

§ 160.036-5 Marking.

(a) *General.* Each hand-held rocket-propelled parachute red flare distress signal shall be legibly marked or labeled as follows:

(Company brand or style designation) HAND-HELD ROCKET-PROPELLED PARACHUTE RED FLARE DISTRESS SIGNAL—20,000 candela—30 seconds burning time. USE ONLY WHEN AIRCRAFT OR VESSEL IS SIGHTED. DIRECTIONS—(In numbered paragraphs, simply worded instructions for firing the device). Service Life Expiration Date (date to be inserted by manufacturer) (Month and year manufactured) (Lot No. ——) Manufactured by (Name and address of manufacturer) U.S. Coast Guard Approval No. ——.

(b) *Marking of expiration date.* The expiration date must be not more than 42 months from the date of manufacture.

(c) *Other marking.*

(1) On each hand-held rocket propelled parachute red flare distress signal there shall be die-stamped in figures not less than 3 mm (⅛ in.) high, on the signal, numbers indicat-

ing the month and year of manufacture, thus: "6-54" indicating June, 1954.

(2) The pyrotechnic candle shall be legibly marked with the month and year of manufacture.

(3) In addition to any other marking place on the smallest packing carton or box containing signals, each carton or box shall be plainly and permanently marked to show the service life expiration date, date of manufacture, and lot number.

(4) The largest carton or box in which the manufacturer ships signals must be marked with the following or equivalent words: "Keep under cover in a dry place."

NOTE: Compliance with the labeling requirements of this section does not relieve the manufacturer of the responsibility of complying with the label requirements of 15 U.S.C. 1263, the Federal Hazardous Substances Act.

§ 160.036-6 Container.

(a) *General.* The container for storing the signals on lifeboats and liferafts is not required to be of a special design or be approved by the Coast Guard. The container must meet the requirements in Subpart 160.021 (§ 160.021-6) except that the wording on the container must be:

HAND-HELD ROCKET-PROPELLED PARACHUTE RED FLARE DISTRESS SIGNALS

§ 160.036-7 Procedure for approval.

(a) Signals are approved by the Coast Guard under the procedures in Subpart 159.005 of this Chapter.

§ 160.036-9 Recognized independent laboratories.

(a) The following independent laboratories have been accepted by the Commandant for conducting the approval and production tests required in this Subpart:

(b) Revised copies of this list may be obtained from Commandant (G-MMT-3/TP12), U.S. Coast Guard Headquarters, Washington, D.C. 20593.

Subpart 160.037—Hand Orange Smoke Distress Signals

AUTHORITY: 46 U.S.C. 481, 49 U.S.C. 1655(b)(1), 49 CFR 1.46(b).

SOURCE: CGD 76-048a and 76-048b, 44 FR 73085, Dec. 17, 1979, unless otherwise noted.

§ 160.037-1 Incorporations by reference.

(a) The following are incorporated by reference into this subpart:

(1) "The Color Names Dictionary" in *Color: Universal Language and Dictionary of Names,* National Bureau of Standards Special Publication 440, December 1976.

(2) "Development of a Laboratory Test for Evaluation of the Effectiveness of Smoke Signals," National Bureau of Standards Report 4792, July 1956.

(b) NBS Special Publication 440 may be obtained by ordering from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 (Order by SD Catalog No. C13.10:440).

(c) NBS Report 4792 may be obtained from the Commandant (G-MMT-3/TP12), U.S. Coast Guard Washington, D.C. 20593.

(d) Approval to incorporate by reference the materials listed in this section was obtained from the Director of the Federal Register on November 1 and 29, 1979. The materials are on file in the Federal Register library.

§ 160.037-2 Type.

(a) Hand orange smoke distress signals specified by this subpart shall be one type which shall consist essentially of a wooden handle to which is attached a tubular casing having a sealing plug at the handle end, the casing being filled with a smoke producing composition and fuse with button of ignition material at the top, and a removable cap having a friction striking material on its top which may be exposed for use by pulling a tear strip. The signal is ignited by scraping the friction striker on top of the cap against the igniter button on top of the body of the signal. Alternate arrangements which conform to the performance requirements of this specification will be given special consideration.

§ 160.037-3 Materials, workmanship, construction, and performance requirements.

(a) *Materials.* The materials shall conform strictly to the specifications and drawings submitted by the manufacturer and approved by the Commandant. The color of the tube shall be orange. The combustible materials shall be of such nature as will not deteriorate during long storage, nor when subjected to frigid or tropical climates, or both.

(b) *Workmanship.* Hand orange smoke distress signals shall be of first class workmanship and shall be free from imperfections of manufacture affecting their appearance or that may affect their serviceability. Moisture proof coatings shall be applied uniformly and shall be free from pinholes or other visible defects which would impair their usefulness.

(c) *Construction.* The casing shall be fitted and secured to the handle with not less than a 25 mm (1 in.) overlap and shall be attached to the handle in such a manner that failure of the joint will not occur during tests, ignition, or operation. The plug shall be securely affixed in the casing to separate the smoke composition from the wooden handle. The smoke composition shall be thoroughly mixed and be uniformly compresssed throughout to preclude variations of density which may adversely affect uniformity of its smoke emitting characteristics. The cap shall have a lap fit of not less than 25 mm (1 in.) over the end of the casing and smoke composition to entirely and securely protect the exposed surface of the igniter button and end of smoke composition and casing, and shall have an inner shoulder so constructed that it is mechanically impossible for the inner surface of the cap to come in contact with the igniter button. The cap shall be securely attached to the casing in such manner as to preclude its accidental detachment. The cap shall be provided on its top with a friction striking material which shall, by a pull of the tear strip, be entirely exposed for striking the friction igniter button. The igniter button shall be non-water soluble or be protected from moisture by a coating of some waterproof substance, and shall be raised or exposed in such manner as to provide positive ignition by the friction striker. The igniter button shall be firmly secured in or on the top of the smoke composition; the arrangement shall be such that the ignition will be transmitted to the smoke producing composition. The assembled signal, consisting of tear strip, cap, casing, and handle, shall be sealed and treated to protect the signal from deterioration by moisture. The protective waterproof coating shall be applied so none adheres to the friction striking surface. Special consideration will be given to alternate waterproofing of the signal by means of a water-resistant coating on the signal plus packaging in a sealed plastic waterproof bag satisfactory to the Commandant.

(d) *Performance.* Signals shall meet all the inspection and test requirements contained in § 160.037-4.

§ 160.037-4 Approval and production tests.

(a) *Approval tests.* The manufacturer must produce a lot of at least 100 signals from which samples must be taken for testing for approval under § 160.037-7. The approval tests are the operational tests and technical tests in paragraphs (c) and (d) of this section. The approval tests must be conducted by an independent laboratory accepted by the Commandant under § 159.010 of this Chapter.

(b) *Production inspections and tests.* Production inspections and tests of each lot of signals produced must be conducted under the procedures in § 159.007 of this Chapter. Signals from a rejected lot must not be represented as meeting this Subpart or as being approved by the Coast Guard. If the manufacturer identifies the cause of the rejection of a lot of signals, the signals in the lot may be reworked by the manufacturer to correct the problem. Samples from the rejected lot must be retested in order to be accepted. Records shall be kept of the reasons for rejection, the reworking performed on the rejected lot, and the results of the second test.

(1) *Lot size.* For the purposes of sampling the production of signals, a lot must consist of not more than 30,000 signals. Lots must be numbered serially by the manufacturer. A new lot must be started with:

(i) Any change in construction details,

(ii) Any change in sources of raw materials, or

(iii) The start of production on a new production line or on a previously discontinued production line.

(2) *Inspections and tests by the manufacturer.* The manufacturer's quality control procedures must include inspection of materials entering into construction of the signals and inspection of the finished signals, to determine that signals are being produced in accordance with the approved plans. Samples from each lot must be tested in accordance with the operational tests in paragraph (c) of this section.

(3) *Inspections and tests by an independent laboratory.* An independent laboratory accepted by the Commandant under § 159.010 of this Chapter must perform or supervise the inspections and tests under paragraph (b)(2) of this section at least 4 times a year, unless the number of lots produced in a year is less than four. The inspections and tests must occur at least once during each quarterly period, unless no lots are produced during this period. If less than four lots are produced, the laboratory must perform or supervise the inspection and testing of each lot. In addition, the laboratory must perform or supervise the technical tests in paragraph (d) of this section at least once for every ten lots of signals produced, except that the number of technical tests must be at least one but not more than four per year. If a lot of signals tested by the independent laboratory is rejected, the laboratory must perform or supervise the inspections and tests of the reworked lot and the next lot of signals produced. The tests of each reworked lot and the next lot produced must not be counted for the purpose of meeting the requirement for the annual number of inspections and tests performed or supervised by the independent laboratory.

(c) *Operational tests.* Each lot of signals must be sampled and tested as follows:

(1) *Sampling procedure and accept/reject criteria.* A sample of signals must be selected at random from the lot. The size of the sample must be the individual sample size in Table 160.037-4(c)(1) corresponding to the lot size. Each signal in the sample is tested as prescribed in the test procedure in paragraph (c)(2) of this section. Each signal that has a defect listed in the table of defeats (Table 160.037-4(c)(2)) is assigned a score (failure percent) in accordance with that table. In the case of multiple defects, only the score having the highest numerical value is assigned to that signal. If the sum of all the failure percents (cumulative failure percent) for the number of units in the sample is less than or equal to the accept criterion, the lot is accepted. If the sum is equal to or more than the reject criterion the lot is rejected. If the cumulative failure percent falls between the accept and reject criteria, another sample is selected from the production lot and the operational tests are repeated. The cumulative failure percent of each sample tested is added to that of the previous samples to obtain the cumulative failure percent for all the signals tested (cumulative sample size). Additional samples are tested and the tests repeated until either the accept or reject criterion for the cumulative sample size is met. If any signal in the sample explodes when fired, or ignites in a way that could burn or otherwise injure the person firing it, the lot is rejected without further testing. (This procedure is diagrammed in figure 160.037-4(c)).

(2) *Test procedure.* Each sample signal (specimen) must be tested as follows:

(i) *Conditioning of test specimens—water resistance.* Immerse specimen horizontally with uppermost portion of the signal approximately 25 mm (1 in.) below the surface of the water for a period of 24 hours. If the signal is protected by alternate waterproofing consisting of a water-resistant coating on the signal plus packaging in a sealed plastic waterproof bag, the 24-hour water immersion conditioning will be conducted while the signal is in the sealed plastic waterproof bag and will be followed by an additional immersion of the bare signal (i.e., after removal from the bag) 25 mm (1 in.) below the surface of the water for a period of 10 minutes.

(ii) *Waterproofing of igniter button.* Remove the cap from the test specimen. Place head of specimen without cap about 25 mm (1 in.) under the surface of water for approximately 5 minutes. Remove specimen from the water and wipe dry.

(iii) *Smoke emitting time.* Ignite specimen according to directions printed on the signal. The smoke emitting time of a specimen shall be obtained by stop watch measurements from the time of distinct, sustained smoke emission until it ceases. The watch shall be stopped during periods of flame emission. The smoke emitting time for a specimen shall be not less than 50 seconds.

(iv) *Ignition and smoke emitting characteristics.* Test specimens shall ignite and emit smoke properly when the directions on the signal are followed. Test specimens shall not ignite explosively in a manner that might be dangerous to the user or persons close by. The plug separating the smoke producing composition from the handle shall in no case allow flame or hot gases to pass through it or between it and the casing in such manner as might burn the hand while holding the signal by the handle.

TABLE 160.037-4(C)(1).—*Accept and reject criteria for operational test lots*

Lot size	Individual sample size	Sample	Cumulative sample size	Accept[1]	Reject[1]
280 or less	8	First	8	(2)	400
		Second	16	100	500
		Third	24	200	600
		Fourth	32	300	700
		Fifth	40	500	800
		Sixth	48	700	900
		Seventh	56	950	951
281 to 500	13	First	13	0	400
		Second	26	100	600
		Third	39	300	800
		Fourth	52	500	1,000
		Fifth	65	700	1,100
		Sixth	78	1,000	1,200
		Seventh	91	1,350	1,351
501 to 1,200	20	First	20	0	500
		Second	40	300	800
		Third	60	600	1,000
		Fourth	80	800	1,300
		Fifth	100	1,100	1,500
		Sixth	120	1,400	1,700
		Seventh	140	1,850	1,851
1,201 to 3,200	32	First	32	100	700
		Second	64	400	1,000
		Third	96	800	1,300
		Fourth	128	1,200	1,700
		Fifth	160	1,700	2,000
		Sixth	192	2,100	2,300
		Seventh	224	2,550	2,551
More than 3,201	50	First	50	200	900
		Second	100	700	1,400
		Third	150	1,300	1,900
		Fourth	200	1,900	2,500
		Fifth	250	2,500	2,900
		Sixth	300	3,100	3,300
		Seventh	350	3,750	3,751

[1] Cumulative failure percent.

[2] Lot may not be accepted. Next sample must be tested.

TABLE 160.037-4(C)(2)

Kind of defects	Percentage of failure
a. Failure to ignite	100
b. Ignites or burns dangerously	50
c. Non-uniform smoke-emitting rate	50
d. Smoke-emitting time less than 70 pct of specified time	100
e. Smoke-emitting time at least 70 pct but less than 80 pct of specified time	75
f. Smoke-emitting time at least 80 pct but less than 90 pct of specified time	50
g. Smoke-emitting time at least 90 pct but less than 100 pct of specified time	25

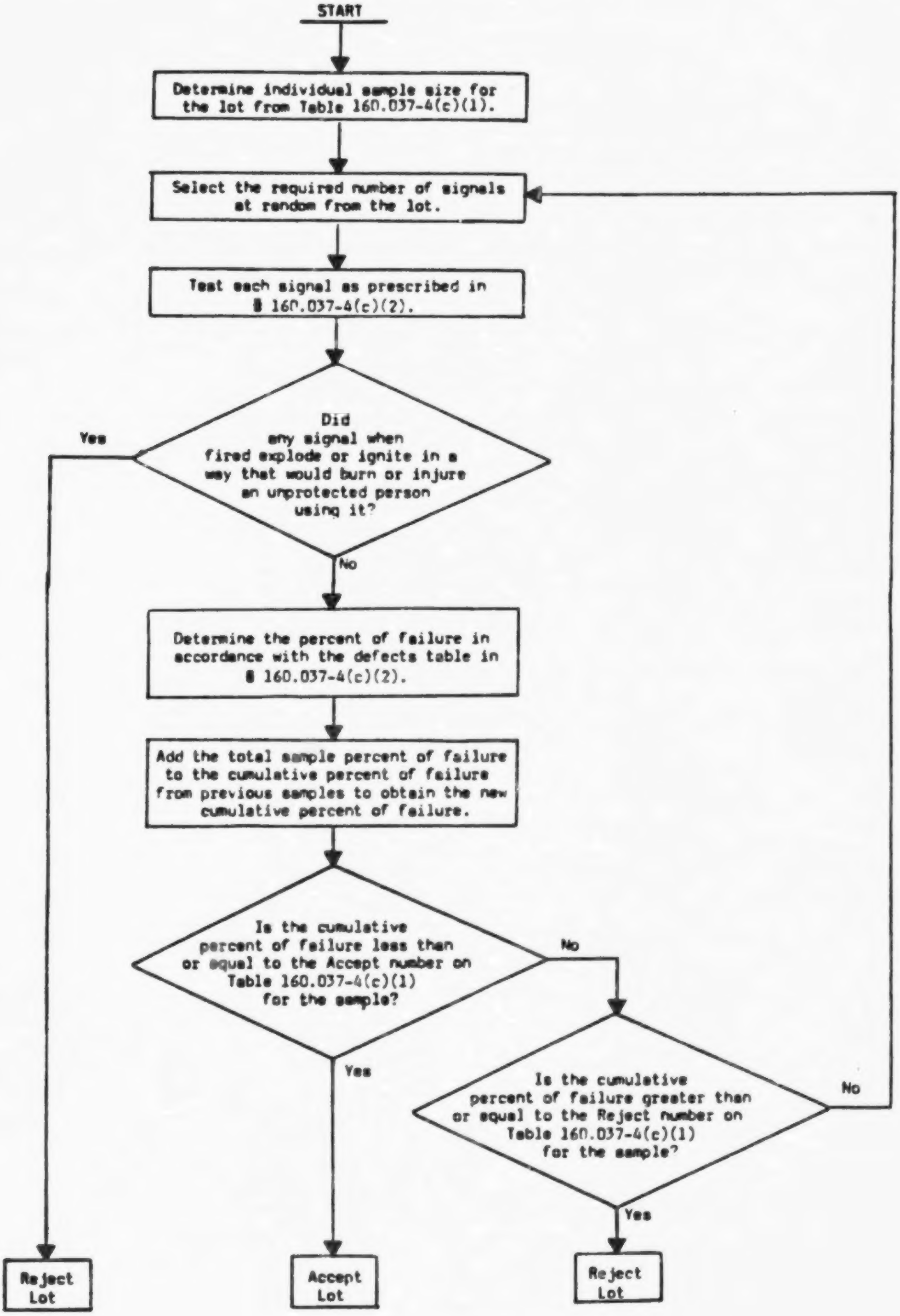

START
Determine individual sample size for the lot from Table 160.037-4(c)(1).
Select the required number of signals at random from the lot.
Test each signal as prescribed in § 160.037-4(c)(2).
Did any signal when fired explode or ignite in a way that would burn or injure an unprotected person using it?
Yes
No
Determine the percent of failure in accordance with the defects table in § 160.037-4(c)(2).
Add the total sample percent of failure to the cumulative percent of failure from previous samples to obtain the new cumulative percent of failure.
Is the cumulative percent of failure less than or equal to the Accept number on Table 160.037-4(c)(1) for the sample?
No
Yes
Is the cumulative percent of failure greater than or equal to the Reject number on Table 160.037-4(c)(1) for the sample?
No
Yes
Reject Lot
Accept Lot
Reject Lot

Figure 160.037-4(c). Operational test procedure.

(d) *Technical tests.* Three signals must be subjected to each of the following tests. Two of the three signals must pass each test in order for the lot of signals to be accepted.

(1) *Underwater smoke emission.* Condition each sample in accordance with paragraph (c)(2)(i) of this section. Ignite specimen and let it burn about 15 seconds in air. Submerge the burning signal in water in a vertical position with head down. Obtain underwater smoke emission time by stop watch measurements from time of submersion until smoke emission ceases. The test specimen shall burn underwater not less than 10 seconds when subjected to this test.

(2) *Bending strength.* Place the specimen on supports 15 cm (6 in.) apart. Attach a weight of 35 kg (77 lb.) to a length of wire. Hang the weight from the supported signal by looping the wire around the signal approximately equidistant from the two points of support. Let the weight hang approximately 5 minutes. The test specimen shall not deflect more than 7 mm (¼ in.), nor shall the joint between the casing and the handle fail when subjected to this test.

(3) *Tensile strength.* Place the specimen in a chuck firmly holding it about 13 mm (½ in.) below the cap. Attach a weight of 35 kg (77 lb.) to a length of wire. Hang the weight from the supported signal by looping the wire through a hole bored perpendicular to and through the axis of the handle. Let the weight hang approximately 5 minutes. The test specimen shall not show noticeable distortion, nor shall the joint between the casing and handle fail, when subjected to this test.

(4) *Elevated temperature, humidity and storage.* Place specimen in a thermostatically controlled even-temperature oven held at 75°C. with not less than 90 percent relative humidity for 72 hours. Remove specimen and store at room temperature (20° to 25°C.) with approximately 65 percent relative humidity for 10 days. If for any reason it is not possible to operate the oven continuously for the 72-hour period, it may be operated at the required temperature and humidity for 8 hours out of each 24 during the 72-hour conditioning period. (Total of 24 hours on and 48 hours off.) The signal shall not ignite or decompose during this conditioning. The signal shall ignite and operate satisfactorily following this conditioning.

(5) *Spontaneous ignition.* Place the specimen in a thermostatically controlled even-temperature oven held at 75°C. with not more than 10% relative humidity for 48 consecutive hours. The signal shall not ignite or undergo marked decomposition.

(6) *Susceptibility to explosion.* Remove smoke composition from signal and punch a small hole in the composition. Insert a No. 6 commercial blasting cap. Ignite the cap. The test specimen shall not explode or ignite.

(7) *Color of smoke.* Ignite specimen in the open air in daytime according to the directions printed on the signal, and determine the smoke color by direct visual comparison of the unshadowed portions of the smoke with a color chart held so as to receive the same daylight illumination as the unshadowed portions of the smoke. The color of the smoke must be orange as defined by Sections 13 and 14 of the "Color Names Dictionary" (colors 34-39 and 48-54).

(8) *Volume and density of smoke.* The test specimen shall show less than 70 percent transmission for not less than 30 seconds when measured with apparatus having a light path of 19 cm (7½ in.), an optical system aperture of +3.7 degrees, and an entrance air flow of 18.4m^3 per minute (650 cu. ft. per minute), such apparatus to be as described in National Bureau of Standards Report No. 4792.

§ 160.037-5 Labeling and marking.

(a) *Labeling.* Each hand orange smoke distress signal shall bear a label securely affixed thereto, showing in clear, indelible black lettering on an orange background, the following wording and information:

(Company brand or style designation)

HAND ORANGE SMOKE DISTRESS SIGNAL

For daytime use—50 seconds burning time

USE ONLY WHEN AIRCRAFT OR VESSEL IS SIGHTED

DIRECTIONS—Pull tape over top of cap. Remove cap and ignite flare by rubbing scratch surface on top of cap sharply across igniter button on head of signal.

CAUTION—Stand with back to wind and point away from body when igniting or signal is burning.

Service Life Expiration Date (Month and year to be inserted by manufacturer) (Month and year manufactured) (Lot No. ——). Manufactured by (Name and address of manufacturer). U.S. Coast Guard Approval No. ——.

(b) *Marking of expiration date.* The expiration date must not be more than 42 months from the date of manufacture.

(c) *Other marking.* (1) There shall be die-stamped, in the side of the wooden handle in figures not less than 3 mm (⅛ in.) high, numbers indicating the month and year of manufacture, thus: "6-54" indicating June, 1954.

(2) In addition to any other marking place on the smallest packing carton or box containing hand orange smoke distress signals such cartons or boxes shall be plainly and permanently marked to show the service life expiration date, date of manufacture, and lot number.

(3) The largest carton or box in which the manufacturer ships signals must be marked with the following or equivalent words: "Keep under cover in a dry place."

NOTE: Compliance with the labeling requirements of this section does not relieve the manufacturer of the responsibility of complying with the label requirements of 15 U.S.C. 1263, the Federal Hazardous Substances Act.

§ 160.037-6 Container.

(a) *General.* The container for storing the signals on lifeboats and liferafts is not required to be of a special design or be approved by the Coast Guard. The container must meet the requirements in Subpart 160.021 (§ 160.021-6) except that the wording on the container must be: "Hand Orange Smoke Distress Signals."

§ 160.037-7 Procedure for approval.

(a) Signals are approved by the Coast Guard under the procedures in Subpart 159.005 of this Chapter.

§ 160.037-9 Recognized independent laboratories.

(a) The following independent laboratories have been accepted by the Commandant for conducting the approval and production tests required in this Subpart:

(b) Revised copies of this list may be obtained from Commandant (G-MMT-3/TP12), U.S. Coast Guard Headquarters, Washington, D.C. 20593.

Subpart 160.038—Magazine Chests, Portable, for Merchant Vessels

AUTHORITY: R.S. 4417a, as amended, 4426, as amended, 4488, as amended, 4491, as amended, Sec. 10, 35 Stat. 428, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, sec. 3, 54 Stat. 347, as amended, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 404, 481, 489, 395, 367, 1333, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-20, June 18, 1956, 21 FR 4894; 167-38, Oct. 26, 1959, 24 FR 8857.

SOURCE: CGFR 49-43, 15 FR 122 Jan. 11, 1950, unless otherwise noted.

§ 160.038-1 Applicable specifications.

(a) There are no other specifications applicable to this subpart.

§ 160.038-2 Type.

(a) Portable magazine chests shall be of a type suitable for stowage of pyrotechnic distress signals, rockets, or powder for line-throwing guns, and shall be of a size not less than 6 nor more than 40 cubic feet capacity. Alternate types of construction to that specified below will be given special consideration.

§ 160.038-3 Materials, workmanship, and construction.

(a) Portable magazine chests shall be constructed of metal and lined with wood.

(b) The lining shall be so fitted and finished as to form a smooth surface within the interior of the chest. Fastenings shall be recessed below the surface to avoid projections within the interior. Construction shall be such as to separate all containers of explosives or pyrotechnics from contact with metal surfaces.

(c) The metal shall be ⅛ inch thick and free from crimps, buckles, and rough edges. All metal surfaces shall be wire brushed and all oil, grease, rust, loose scale, and other extraneous matter, removed before application of any primer. All surfaces of the metal chest and fittings shall be given a heavy coat of quick drying red lead, zinc chromate, or other suitable primer before painting. The finish shall consist of two coats of paint. The interior shall be lined with wood sheathing of a minimum thickness of ¾ inch. Securing means shall be countersunk below the surface of the sheathing. Securing means for the cover and 4 lashing rings shall be provided. The lashing rings shall be 3″ I.D. × ⅜″ wire permanently attached to the magazine chest. Two runners, not less than 2 inches high shall be permanently attached to the bottom of the chest.

§ 160.038-4 Inspections and tests.

(a) Portable magazine chests specified by this subpart are not ordinarily subject to regularly s scheduled factory inspections.

§ 160.038-5 Marking.

(a) Portable magazine chests used for the stowage of pyrotechnic signals, rockets, and powder for line-throwing guns shall be marked, in letters at least 3 inches high, with the following legend: "Portable Magazine Chest, Inflammable—Keep Lights and Fire Away."

§ 160.038-6 Procedure for approval.

(a) Portable magazine chests are not subject to formal approval, but will be accepted by the inspector on the basis of this subpart at annual inspections and reinspections of vessels.

Subpart 160.039 [Reserved]

Subpart 160.040—Line-Throwing Appliance, Impluse-Projected Rocket Type (and Equipment)

AUTHORITY: 46 U.S.C. 481, 49 U.S.C. 1655(b)(1), 49 CFR 1.46(b).

SOURCE: CGD 76-048a and 76-048b, 44 FR 73089, Dec. 17, 1979, unless otherwise noted.

§ 160.040-1 Incorporations by reference.

(a) The following military specifications are incorporated by reference into this subpart:

(1) MIL-R-23139 B, 16 August 1965—Rocket Motors, Surface Launched, Development and Qualification Requirements for.

(2) MIL-R-45505 A, 2 April 1971—Line Throwing Apparatuses, Rocket and Projectile Units.

(b) The military specifications may be obtained from Customer Service, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120 (tel: (215) 697-2000). These specifications are also on file in the FEDERAL REGISTER library.

(c) Approval to incorporate by reference the materials listed in this section was obtained from the Director of the FEDERAL REGISTER on September 24, 1979.

§ 160.040-2 Type and size.

(a) Impulse-projected rocket type line-throwing appliances required by this subpart shall be of a type consisting essentially of a pistol or launcher, which can be hand held and hand directed, or suitably supported and hand directed.

(b) Impulse-projected rocket type line-throwing appliances shall weigh (complete with one rocket, bridle, and leader) not to exceed 16 kg (35 lb.) and shall be of a size easily manageable by one person.

(c) Alternate arrangements which meet the performance requirements of this subpart will be given special consideration. Line-throwing appliances meeting the requirements of MIL-L-45505 Type I will be considered as meeting the requirements of this subpart subject to approval of the Commandant.

§ 160.040-3 Materials, construction, workmanship, and performance requirements.

(a) *Materials.* All materials used in the construction of impulse-projected rocket type line-throwing appliances and equipment shall be of good quality suitable for the purpose intended, and shall conform ot this subpart and to the specifications submitted by the manufacturer and approved by the Commandant. The choice of materials, when there is no specific requirement, shall be such that maximum safety to operating personnel will be maintained, and that resistance to corrosion by salt water or spray, shock, temperature change, and wear will be obtained. The use of dissimilar materials in combination shall be avoided wherever possible, but when such contacts are necessary, provision shall be made to prevent such deleterious effects as galvanic corrosion, freezing or buckling of moving parts, and loosening or tightening of joints due to differences in coefficients of thermal expansion.

(b) *Construction.* The design and construction shall be such as to obtain effective and safe operation aboard vessels at sea.

(c) *Workmanship.* Impulse-projected rocket type line-throwing appliances shall be of first class workmanship and shall be free from imperfections of manufacture affecting their appearance or that may affect their serviceability.

(d) *Performance.* When the rocket is fired from the appliance in accordance with the manufacturer's instructions, it shall be capable of passing the tests specified by § 160.040-5(c).

§ 160.040-4 Equipment for impulse-projected rocket type line-throwing appliance.

(a) Four rocket projectiles, each complete with bridle and leader of fire-resistant materials. Two of the projectiles shall be of the buoyant type.

(b) Not less than 4 primer-ejector cartridges which fit the chamber of the pistol, gun, or launcher.

(c) Four service lines, each 4 mm ($\frac{5}{32}$ in.) minimum diameter with a minimum breaking strenght of at least 2,250 N (500 lb.), and in one continual length not less than that specified in the approval of the appliance carried, without splice, knot, or other retarding or weaking features. The length of each service line will be assigned in the approval of the appliance as a round number approximately one-third in excess of the average distance the line is carried in the tests required by § 160.040-7(c). The line shall be of either natural or synthetic fibers suitable for marine usage. The end of the line intended to be attached to the projectile shall have securely attached thereto a substantial tag bearing a permanent legend indicating its purpose, and the other end of the line shall be tagged in the same manner to prevent delay in securing proper and immediate action with the equipment. Each line shall be coiled, faked, or reeled in its own faking box or reel in such manner that when all the line leaves the container, it shall automatically become unattached and free from the container. The faking box or reel shall be big enough for the line. The reel type container shall consist of a reel upon which the line may be readily coiled and a canister or container into which the line may be placed that affords a fair lead through which the line may pay out. The reel must be so designed as to permit easy withdrawal after the line has been coiled. Containers of new lines shall bear the name of the manufacturer, date of manufacture, and a statement to the effect that in all respects the line meets the requirements of this specification.

(d) [Reserved]

(e) One cleaning rod with wire brush of non-ferrous metal, prongs arranged in a spiral of sufficient rigidity and size to clean the bore.

(f) One can of oil suitable for cleaning and preserving the appliance.

(g) Twelve flannel wiping patches of sufficient size to cover the brush and suitable for wiping the bore clean.

(h) One set of instructions including a list of the equipment furnished with the appliance, information as to the proper maintenance of the appliance and equipment, and directions for loading and firing the appliance in service use shall be permanently engraved in plastic and mounted conspicuously in the case or box required by paragraph (i) of this section.

(i) A suitable case or box, properly compartmented for stowage of the appliance and auxiliary equipment, is required for stowage on merchant vessels. The service line and auxiliary line need not be stowed in the case.

§ 160.040-5 Approval and production tests.

(a) *Approval tests.* An independent laboratory accepted by the Commandant under § 159.010 of this Chapter must perform or supervise the performance tests in paragraph (c) of this section.

(b) *Production inspections and tests.* Production inspections and tests must be conducted under the procedures in § 159.007 of this Chapter. Each appliance or lot of rockets which fails the inspections and tests must not be represented as meeting this Subpart or as being approved by the Coast Guard.

(1) *Inspections and tests by the manufacturer.* The manufacturer's quality control procedures must include the inspection of appliances during production as well as inspection of finished appliances, to determine that the appliances are being produced in accordance with the approved plans. The performance tests in paragraph (c) of this section must be performed by the manufacturer.

(2) *Inspections and tests by an independent laboratory.* An independent laboratory accepted by the Commandant under § 159.010 of this Chapter must inspect and test appliances and rockets at least once each year. The inspection must determine that the appliances and rockets are being produced in accordance with the appropriate plans. The tests must be in accordance with paragraph (c) of this section.

(c) *Performance tests.*—(1) *Appliances.* Each appliance shall be tested by firing three rounds. These rounds may be regular rockets or buoyant type rockets carrying regular service lines, as provided in subparagraph (2) of this paragraph or may be dummy projectiles, of the same size and weight as the regular rocket projectile, expelled into an earthen bank or other resisting medium from a reasonable distance. At least one of the rounds shall be fired using a primer-ejector cartridge loaded with a charge double the normal charge; the other rounds may be fired using regular primer-ejector cartridges. After the firing tests have been completed, each appliance shall be fired twice using the regular primer-ejector cartridges only, for the purposes of demonstrating that the appliance is still in operating condition. The entire assembly of the appliance shall then be examined. Results of the test firing and the physical examination shall show none of the following: Failure to eject cartridge, failure to close breech, trigger malfunction, safety lock failure to function, breech catch malfunction, broken spring, broken handgrips, cracked barrel or discharge chamber, firing pin or plunger broken, distorted or excessively worn or loose breech. A single misfire is acceptable if a second cartridge fires on repeated test. Misfire of both shall be cause for rejection of the appliance. More than one loose screw shall be cause for rejection. If an appliance exhibits a single loose screw, it may be retightened.

(2) *Rockets.* The rocket shall utilize a solid fuel propellant which shall function in accordance with all applicable requirements of MIL-R-23139. The use of black powder for the rocket motor is not acceptable. The ignition of the rocket motor shall occur at such a distance from the appliance so as not to spew flame, hot gaseous exhaust, or hot particles of propellant in such a manner as to create a hazard to personnel or the vessel. The rocket shall have a service line carrier assembly permanently attached and made of material, or suitably protected, to withstand the heat from the rocket motor's exhaust. From each 200 rockets manufactured, not less than three must be selected to be tested by firing with service line attached. The rockets selected will, over a period of time, include representative samples of both the regular and buoyant type rockets, except that the approval test must include both types. The line shall be carried, under conditions of reasonably

still atmosphere, a minimum of 230 m (750 ft.), without breaking or fouling the line, and the rocket shall alight not more than 15 m (50 ft.) from either side of the target line. In no case shall a test rocket be fired without a line attached. After a buoyant type rocket is fired, it shall demonstrate its ability to float in water for not less than 2 hours. Failure to meet any of the test requirements, nose cone cracks, rupture in flight, erratic flight, or unusual burning rate, shall be cause for rejection of rockets produced until suitable correction has been made. If rockets selected from this lot are used for the tests required in paragraph (c)(1) of this section this may be accepted as meeting the requirements of this paragraph.

(3) *Primer-ejector cartridges.* Inasmuch as primer-ejector cartridges are used for the tests required by subparagraphs (1) and (2) of this paragraph, additional tests of primer-ejector cartridges will be made only when deemed advisable by the independent laboratory. Misfiring or failure of any kind shall be cause for rejection of cartridges produced until suitable correction has been made.

§ 160.040-6 Marking and labeling.

(a) The appliance shall be permanently and legibly marked by die-stamping or raised letters with the model designation of the appliance, the manufacturer's serial number for the appliance, the official Coast Guard approval number, and the name of the manufacturer. The rocket-projectiles shall be legibly marked with the name of the manufacturer, the model designation, the official Coast Guard approval number, and month and year manufactured. Primer-ejector cartridges shall be permanently and legibly marked with the name of the manufacturer, and the model designation, the official Coast Guard approval number, and the month and year manufactured.

(b) The containers of new service lines shall bear the name of the manufacturer, date of manufacture, and a statement to the effect that in all respects the line meets the requirements of this subpart for service lines. Line faking boxes and reels shall bear the name of the manufacturer.

NOTE: Compliance with the labeling requirements of this section does not relieve the manufacturer of the responsibility of complying with the label requirements of 15 U.S.C 1263, the Federal Hazardous Substances Act.

§ 160.040-7 Procedure for approval.

(a) Rocket type line-throwing appliances are approved by the Coast Guard under the procedures in Subpart 159.005 of this Chapter.

§ 160.040-9 Recognized independent laboratories.

(a) The following independent laboratories have been accepted by the Commandant for conducting the approval and production tests required in this Subpart:

(b) Revised copies of this list may be obtained from Commandant (G-MMT-3/TP12), U.S. Coast Guard Headquarters, Washington, D.C. 20593.

Subpart 160.041—Kits, First-Aid, for Merchant Vessels

AUTHORITY: R.S. 4417a, as amended, 4426, as amended, 4488, as amended, 4491, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, sec. 3, 54 Stat. 347, as amended, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 404, 481, 489, 367, 1333, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-20, June 18, 1956, 21 FR 4894; 167-38, Oct. 26, 1959, 24 FR 8857.

SOURCE: CGFR 50-12, 15 FR 3093, May 20, 1950, unless otherwise noted.

§ 160.041-1 Applicable specification and publication.

(a) *Specification.* The following specification, of the issue in effect on the date first-aid kits are manufactured, forms a part of this subpart:

(1) Federal specification:

GG-K-391, Kits (Empty), First Aid, Burn Treatment, and Snake Bite; and Kit Contents.

(b) *Publication.* The following publication, of the issue in effect on the date first-aid kits are manufactured, forms a part of this subpart:

(1) National Bureau of Standards Simplified Practice Recommendation:

No. R178-41, Packaging of First-aid Unit Dressings and Treatments.

(c) Copies of the specification and publication referred to in this section shall be kept on file by the manufacturer, together with the approved plans and certificate of approval. They shall be kept for a period consisting of the duration of approval and 6 months after termination of approval. The Federal specification may be purchased from the Business Service Center, General Services Administration, Washington, D.C. 20407. The Naval Bureau of Standards publication may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

[CGFR 50-12, 15 FR 3093, May 20, 1950, as amended by CGFR 65-16, 30 FR 10899, Aug. 21, 1965]

§ 160.041-2 Type and size.

(a) *Type.* First-aid kits covered by this specification shall be of the watertight cabinet carrying type designated as Type II, Grade A, class B by Federal Specification GG-K-391. Alternate arrangements of materials meeting the performance requirements of this specification will be given special consideration.

(b) *Size.* First-aid kits shall be of a size (approximately 9″ x 9″ x 2½″ inside) adequate for packing 24 standard single cartons (defined by National Bureau of Standards Simplified Practice Recommendations for Packaging of First-aid Unit Dressings and Treatments), or equivalent combinations of single, double, or triple cartons, the arrangement of the cartons to be such as to permit ready access to each item contained in the kit.

§ 160.041-3 Construction and workmanship.

(a) *Construction.* The container shall be of substantial and rugged construction, with the body, handle, and all fittings of a corrosion-resistant material or suitably protected against corrosion. All ferrous metal employed shall be protected by hot dip galvanizing, or other equally effective means. The thickness of metal in the container shall be at least equal to 20 USSG and all seams and joints shall be welded or brazed. Either the body or the cover shall contain a gasket of molded rubber or other material which will give a suitable watertight seal, and the mating piece shall be flanged or turned to form an effective bearing surface. The cover shall be fastened to the body by two positive closed type pull-down snap fasteners on one edge, which together with two positive open type pull-down snap fasteners at the opposite edge, and one positive open type pull-down snap fastener at each of the other two edges, shall effectively hold the bearing surfaces together to provide the required watertight closure. The container shall be capable of being opened and reclosed watertight.

(b) *Handle.* A suitable carrying handle, approximately 3″ x 1¼″, of 0.125″ diameter steel wire, shall be securely mounted on the side or end of the body of the container, and be so arranged that when laid flat against the container it will not project beyond either the upper or lower edge, and shall provide ample finger clearance for carrying.

(c) *Cover fasteners.* The cover fasteners shall be of the pull-down, draw bolt type or equivalent and of sufficient size and strength for the purpose. The fasteners shall be so constructed as not to jar loose by vibration, but to permit easy and quick opening with one hand. There may be no sharp edges and all parts shall be adequately protected against corrosion.

§ 160.041-4 Contents.

(a) *Individual cartons.* Cartons shall be of the standard commercial unit type referred to by Simplified Practice Recommendation R178-41, properly labeled to designate the name, size of contents, and method of use, and shall contain all information required by Federal and State laws. Each package shall be inclosed in a jacket of tough, transparent material, properly sealed, which shall meet the watertight requirements of § 160.041-5(f). Each carton and the contents therein shall conform to the applicable requirements of Federal Specification GG-K-391. Medicinal products shall conform to the latest revision of the U.S. Pharmacopoeia. Vials for tablets shall not be made of glass.

(b) *Items.* The items contained in first-aid kit shall be as listed in Table 160.041-4(b).

TABLE 160.041-4(b)—ITEMS FOR FIRST-AID KIT

Item	Number per package	Size of package	No. of packages
Bandage compress—4″	1	Single	5
Bandage compress—2″	4	do	2
Waterproof adhesive compress—1″	16	do	2
Triangular bandage—40″	1	do	3
Eye dressing packet, ⅛ ounce Opthalmic ointment, adhesive strips, cotton pads.	3	do	1
Bandage, gauze, compressed, 2 inches by 6 yards	2	do	1
Tourniquet, forceps, scissors, 12 safety pins	1, 1, 1, and 12, respectively	Double	1
Wire splint	1	Single	1
Ammonia inhalants	10	do	1
Iodine applicators (½ ml swab type)	10	do	1
Aspirin, phenacetin and caffeine compound, 6½ gr tablets, vials of 20.	5	Double	1
Sterile petrolatum gauze, 3″ x 18″	4	Single	3

(c) *Instructions.* Instructions for the use of the contents of the first-aid kit shall be printed in legible type on a durable surface and shall be securely attached to the inside of the cover. The instructions for the use of the contents are as follows:

DIRECTIONS FOR THE USE OF THE FIRST-AID KIT

Item title	*Remarks*
Ammonia inhalants	Break one and inhale for faintness, fainting, or collapse.
Aspirin, phenacetin, caffeine tablets	Chew up and swallow 2 tablets every three hours for headache, colds, minor aches, pains, and fever. Maximum of 8 in twenty-four hours.
Bandage compress, 4″ and 2″	Apply as a dressing over wound. DON'T touch part that comes in contact with wound.
Bandage, gauze, compressed, 2″	For securing splints, dressings, etc.
Bandage, triangular, compressed	Use as arm sling, tourniquet, or for retaining splints or dressings in place.
Burn dressing	The petrolatum gauze bandage is applied in at least two layers over the burned surface and an area extending 2″ beyond it. The first dressing should be allowed to remain in place, changing only the outer, dry bandage as needed, for at least 10 days unless signs of infection develop after several days, in which case the dressing should be removed and the burn treated as an infected wound. Watch for blueness or coldness of the skin beyond the dressing and loosen the dressing if they appear.
Compress, adhesive, 1″	Apply as dressing over small wounds. DON'T touch part that comes in contact with wound.
Eye patch	Apply as dressing over inflamed or injured eye.
Forceps	Use to remove splinters or foreign bodies. Don't dig.
Ophthalmic ointment	Apply in space formed by pulling lower eyelid down, once daily for inflamed or injured eyes. Don't touch eyeball with tube.
Splint, wire	Pad with gauze and mold to member to immobilize broken bones. Hold in place with bandage. Do not attempt to set the bone.
Tincture of iodine, mild	Remove protective sleeve, crush tube and apply swab end. DON'T use in or around eyes.
Tourniquet	For control of hemorrhage. Loosen for a few seconds every 15 minutes.

§ 160.041-5 Inspections and tests.

(a) *General.* First-aid kits specified by this subpart are not inspected at regularly scheduled factory inspections of production lots, but the Commander of the Coast Guard District in which the kits are manufactured may detail an inspector at any time to visit any place where approved kits are manufactured to check materials and construction methods and to conduct such examinations and tests as may be required to satisfy himself that the first-aid kits are being manufactured in accordance with the requirements of this subpart and in accordance with the manufacturer's plans and specifications approved by the Commandant.

(b) *Accelerated weathering.* The container without contents shall be exposed to ultra violet light and subjected to a spray of water for about 30 seconds every 20 minutes for 100 hours at 120° F. As an alternate to this test the container may be exposed to an ultra violet light for 100 hours at 130° F. without the water spray. There shall be no evidence of warping or deterioration as a result of this test.

(c) *Salt spray.* The container shall be exposed to a spray of 20% by weight of reagent grade sodium chloride at about 95° F. for 100 hours. There shall be no evidence of corrosion or disintegration of the material as a result of this test.

(d) *Temperature change.* The container shall be exposed to a temperature of 150° F. for one hour and then to a temperature of 30° F. below zero for one hour. There shall be no warping or deterioration of the gasket material as a result of this test.

(e) *Container watertightness.* After the completion of all other container tests, a closed empty container, lined with colored blotting paper, with the cover in a horizontal position and uppermost shall be submerged under a head of one foot of water for a period of two hours. At the end of this period the container shall be removed, opened, and examined for the presence of moisture. No seepage shall be allowed.

(f) *Carton watertightness.* Four cartons from each container tested shall be submerged under a head of one foot of water for a period of two hours. Upon opening the sealed wrappers there shall be no evidence of leakage of water.

§ 160.041-6 Marking.

(a) Each approved first-aid kit shall be permanently marked with the following information: name of manufacturer, trade name symbol, model number, or other identification used by the manufacturer, the Coast Guard Approval Number, and the words "FIRST-AID KIT." This information may be embossed on the container or may be applied by silk screen process, using a suitable paint and protected as necessary to withstand the required tests, or by other means shown to be acceptable.

§ 160.041-7 Procedure for approval.

(a) *General.* First-aid kits for use in conjunction with lifesaving equipment on board merchant vessels are approved only by the Commandant, United States Coast Guard, Washington, D.C., 20226. Correspondence pertaining to the subject matter of this specification shall be addressed to the Commander of the Coast Guard District in which the kits are manufactured.

(b) *Manufacturer's plans.* In order to obtain approval, submit detailed plans showing fully the construction, material specification, arrangement, and list of contents to the Commander of the Coast Guard District in which the factory is located. Each drawing shall have an identifying number, and date, and shall indicate the manufacturer's symbol, trade name, or other identification for the first-aid kit. At the time of selection of the pre-approval sample, the manufacturer shall furnish the inspector 4 copies of all plans and specifications, corrected as may be required, for forwarding to the Commandant.

(c) *Pre-approval sample.* After the first drawings have been examined and found to appear satisfactory, a marine inspector will be detailed to the factory to observe the manufacturing facilities and methods and to obtain two samples, complete with contents, which will be forwarded, prepaid by the manufacturer, to the Commandant for the necessary conditioning and tests in accordance with § 160.041-5 to determine the suitability of the first-aid kit for use in conjunction with lifesaving equipment on board merchant vessels. The cost of the tests shall be borne by the manufacturer.

[CGFR 50-12, 15 FR 3093, May 20, 1950, as amended by CGFR 65-16, 30 FR 10899, Aug. 21, 1965]

Subpart 160.042—Skids, Liferaft, for Merchant Vessels

AUTHORITY: R.S. 4417a, as amended, 4426, as amended, 4488, as amended, 4491, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, sec. 3, 54 Stat. 347, as amended, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 404, 481, 489, 367, 1333, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-20, June 18, 1956, 21 FR 4894; 167-38, Oct. 26, 1959, 24 FR 8857.

SOURCE: CGFR 50-12, 15 FR 3095, May 20, 1950, unless otherwise noted.

§ 160.042-1 Applicable specification.

(a) The following specification, of the issue in effect on the date life raft skids are manufactured, forms a part of this subpart:

(1) Coast Guard specification:

160.018, Life Rafts.

§ 160.042-2 General requirements.

(a) The requirements of this subpart provide for a standard life raft skid for use on ocean and coastwise vessels in conjunction with the stowage of Type A rafts which may be used on such vessels.

(b) Life raft skids shall be constructed and arranged so as to properly support a Type A life raft in the stowed position and permit the launching of the life raft directly into the water without the application of any force other than that necessary to release the gripping arrangement and operate the release mechanism.

(c) Arrangements other than those specified by this subpart will be given special consideration.

§ 160.042-3 Construction.

(a) The trackways of the skids shall be constructed of 6" x 3½" x ½" structural angles, or of material of approved shape and equivalent strength, inclined approximately 60 degrees from the horizontal. The trackways shall be spaced 8'-4" from the inside of the 3½" vertical leg of one trackway angle to the inside of the 3½" vertical leg of the other trackway angle. The inside of the 6" leg of the trackway angles shall form the skid surface for the life raft. The trackways shall be supported by a substantial structure suitable for stowing a Type A life raft at a 60-degree angle without having the raft project over the side of the vessel.

(b) The lower end of the life raft shall be supported by a base plate so arranged as to permit launching of the raft by a quick release assembly.

(c) All bearing surfaces of the quick release mechanism shall be constructed of non-corrosive metal. Alemite fittings shall be provided to insure positive lubrication of all bearing surfaces.

§ 160.042-4 Inspection.

(a) Life raft skids covered by this subpart are not subject to inspection at the place of manufacture, but are inspected on the basis of this specification during the annual or other inspection of the vessel upon which they are placed.

§ 160.042-5 Procedure for approval.

(a) Life raft skids are not subject to formal approval by the Commandant, but for each merchant vessel on which Type A life rafts are to be installed, plans showing the construction and arrangement of the life raft stowage and launching device on the vessel are required to be submitted for approval to the Commandant through the Commander of the Coast Guard District prior to the actual installation. Life raft skids should comply with the requirements of this specification in order to be acceptable for use in such installations.

(b) Correspondence pertaining to the subject matter of this specification should be addressed to the Commander of the Coast Guard District in which the skids are to be installed.

Subpart 160.043—Jackknife (With Can Opener) for Merchant Vessels

AUTHORITY: R.S. 4417a, as amended, 4426, as amended, 4488, as amended, 4491, as amended, sec. 10, 35 Stat. 428, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, sec. 3, 54 Stat. 347, as amended, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 404, 481, 489, 395, 367, 1333, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-20, June 18, 1956, 21 FR 4894; CGFR 56-28, July 24, 1956, 21 FR 5659; 167-38, Oct. 26, 1959, 24 FR 8857.

SOURCE: CGFR 50-12, 15 FR 3095, May 20, 1950, unless otherwise noted.

§ 160.043-1 Applicable specification and plan.

(a) *Specification.* The following specification, of the issue in effect on the date jackknives are manufactured, forms a part of this subpart:

(1) Federal specification:

QQ-M-151, Metals; General Specification for Inspection of.

(b) *Plan.* The following plan, of the issue in effect on the date jackknives are manufactured, forms a part of this subpart:

(1) Coast Guard:

Dwg. No. 160.043-1(b), Jackknife (With Can Opener).

(c) *Copies on file.* A copy of the above specification and reference plan shall be kept on file by the manufacturer, together with the approved plans and certificate of approval.

§ 160.043-2 Type.

(a) The jackknife specified by this subpart shall be of a type as illustrated by Drawing No. 160.043-1(b), which consists of a one-bladed knife fitted with a can opener and a shackle to which a lanyard is attached, all made from materials as specified in this subpart. Alternate arrangements will be given special consideration.

§ 160.043-3 Materials.

(a) *Blade, can opener, and springs.* The blade shall be made of AISI Type 440B stainless steel, heat treated to show a Rockwell hardness of C55 to C59. The can opener shall be made of AISI Type 420 stainless steel, heat treated to show a Rockwell hardness of C50 to C54. The springs shall be made of AISI Type 420 stainless steel, heat treated to show a Rockwell hardness of C44 to C48.

(b) *Linings and center.* The linings and center shall be hard brass.

(c) *Bolsters and shackle.* The bolsters and shackle shall be 18 percent nickel-silver.

(d) *Handles.* The handles shall be good quality, thermosetting, high impact plastic.

(e) *Rivets and pins.* The rivets and pins shall be either hard brass or 18 percent nickel-silver as specified in this subpart.

(f) *Lanyard.* The lanyard shall be cotton rope, $\frac{1}{8}$ inch nominal diameter.

§ 160.043-4 Construction and workmanship.

(a) *Blade.* The blade shall be not less than 0.095 inch thick at the tang. Shall have a triangular section and sheeps foot point. It shall have a cutting edge approximately $3\frac{1}{8}$ inches in length and shall be approximately $\frac{13}{16}$ inch in height at the point. The blade shall be uniformly ground and finished on both sides and sharpened to a uniform and keen edge, and it shall have a common nail nick on one side. Before assembling, the sides of the tang shall be uniformly polished.

(b) *Can opener.* The can opener shall be not less than 0.072 inch thick at the tang, and $1\frac{11}{16}$ to $1\frac{15}{16}$ inches long overall. It shall be so designed that the cutting action turns the ragged edge down into the can, and shall be mounted at the same end of the knife as the blade and in such a manner that both rectangular and circular cans may be opened with a minimum of effort when the knife is held in the right hand and operated in a clockwise direction around the can. The cutting edge shall be suitably formed to obtain a smooth cutting action. It shall have a common nail nick on one side, and the extreme distal end shall be pointed. It shall be polished on both sides, and before assembling, the side of the tang shall be polished.

(c) *Springs.* Each spring shall be of a thickness corresponding to the blade it operates, and the back edge and that section of the front edge coming in contact with the end of the tang of the blade shall be polished.

(d) *Linings and center.* Linings and center shall be not less than 0.022 inch in thickness and shall be polished before assembly.

(e) *Bolsters.* The bolsters shall be approximately $\frac{9}{16}$ inch long by 0.100 inch thick measured at the center line.

(f) *Shackle.* The shackle shall be of conventional design, not less than 0.120 inch in diameter, and shall extend not less than ¾ inch from the end of the knife. The shackle shall be attached to the knife by a solid nickel-silver pin not less than 0.080 inch in diameter which shall pass through the shackle and be securely fastened.

(g) *Handles.* The handles shall be approximately 3¾ inches long. They shall be well fitted at the bolsters and fastened to the linings by two solid rivets countersunk on the inside of the linings and smoothly rounded on the outside.

(h) *Rivets and pins.* Pins holding the handles to the linings shall be of hard brass, not less than 0.048 inch in diameter. Middle and end pins shall be of hard brass not less than 0.095 inch in diameter. The bolster rivet shall be 18 percent nickel-silver not less than 0.095 inch in diameter. All rivets and pins shall have carefully spun heads.

(i) *Lanyard.* A lanyard 6 feet in length shall be secured to the shackle.

(j) *Polishing and oiling.* After assembly all outside surfaces shall be buffed, and the metal parts polished uniformly. The working parts shall be cleaned and oiled with a good grade of joint oil.

(k) *Workmanship.* Workmanship shall be first class in all respects, and jackknives shall be free from defects which may affect their serviceability.

§ 160.043-5 Inspections and tests.

(a) *General.* Jackknives are not ordinarily subjected to regularly scheduled factory inspections, but the Commander of the Coast Guard District in which they are manufactured may detail an inspector at any time to places where jackknives are manufactured to check materials and construction methods, and to conduct such tests as may be required to satisfy himself that jackknives are being manufactured in compliance with the requirements of this specification and the manufacturer's plans and specifications as approved by the Commandant. The manufacturer shall admit the inspector to his plant and shall provide a suitable place and the necessary apparatus for use of the inspector in conducting tests at the place of manufacture.

(b) *Hardness test.* Hardness of the blade, can opener, and spring metal shall be determined in accordance with the Rockwell method as described in Federal Specification QQ-M-151. Hardness impressions shall be made at locations representing the cutting edges and surfaces subject to wear, and they shall fall within the ranges set forth in § 160.043-3(a).

(c) *Bending and drop tests.* With all of the blade of the knife except the tang clamped in vertical jaws so that the handle is in a horizontal position, a downward load of 15 pounds shall be suspended from the lanyard and allowed to hang for a period of 5 minutes. The knife shall then be turned over, and the test repeated with the can opener in the jaws. The knife shall then be dropped on its side from a height of 8 feet onto a concrete floor. Both the blade and the can opener shall open and close properly, and the knife shall show no other evidence of failure at the conclusion of these tests.

(d) *Cutting test.* The knife shall be used to cut various nonmetallic objects, including at least 10 shavings from a strip of oak or other hardwood, and to open various rectangular and circular cans, and shall show no noticeable loss in cutting ability.

§ 160.043-6 Marking and packing.

(a) *General.* Jackknives specified by this subpart shall be stamped or otherwise permanently and legibly marked on the tang of the blade with the manufacturer's name or with a trade mark of such known character that the source of manufacture may be readily determined, and with the manufacturer's type or size designation.

(b) *Instructions for can opener.* With each jackknife the manufacturer shall supply instructions, complete with an illustration, indicating the proper method for using the can opener.

(c) *Packing.* Each jackknife, complete with lanyard attached, shall be packed in a heat-sealed bag of waterproof vinyl resin or polyethylene film not less than 0.004 inch in thickness. The bag shall be marked in a clear and legible manner with the Coast Guard approval number, the name and address of the manufacturer, and in letters not less than ¼ inch in height with the words. "JACKKNIFE (WITH CAN OPENER)". The instructions for use of the can opener as required by paragraph (b) of this section may also be printed on the bag.

§ 160.043-7 Procedure for approval.

(a) *General.* Jackknives for use on merchant vessels are approved only by the Commandant, United States Coast Guard. Correspondence relating to the subject matter of this specification shall be addressed to the Commander of the Coast Guard District in which the factory is located.

(b) *Pre-approval samples and plans.* Manufacturers who desire to manufacture approved jackknives shall submit to the Commander of the Coast Guard District in which the factory is located 4 sample jackknives, together with 4 copies of fully-dimensioned descriptive drawings, including an assembly drawing, drawings for each of the component parts, and a bill of materials for the knife.

(c) *Pre-approval tests.* The Commander of the Coast Guard District will forward the sample knives and drawings to the Commandant for examination and tests in accordance with § 160.043-5(b) through (d) to determine compliance with this subpart and suitability of the jackknife for type or brand approval for use on merchant vessels.

Subpart 160.044—Pumps, Bilge, Lifeboat, for Merchant Vessels

AUTHORITY: R.S. 4417a, as amended, 4426, as amended, 4488, as amended, 4491, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, sec. 3, 54 Stat. 347, as amended, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 404, 481, 489, 367, 1333, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-20, June 18, 1956, 21 FR 4894; 167-38, Oct. 26, 1959, 24 FR 8857.

SOURCE: CGFR 50-30, 16 FR 1085, Feb. 6, 1951, unless otherwise noted.

§ 160.044-1 Applicable specifications.

(a) There are no other specifications applicable to this subpart.

§ 160.044-2 Types and sizes.

(a) *Type.* Bilge pumps covered by this subpart shall be manually operated, either oscillating, wing type, or full rotary type, with mountings so arranged as to permit attachment to a thwart or other part of the lifeboat structure without interference with the seating arrangement. Alternate types, arrangements or materials, which meet the performance requirements of this subpart will be given special consideration

(b) *Sizes.* Bilge pumps covered by this subpart shall be of three sizes, having capacities as follows:

(1) *Size No. 1.* 5 gallons per minute at 65 double strokes,[1] for lifeboats up to 330 cubic feet capacity.[2]

(2) *Size No. 2.* 6 gallons per minute at 50 double strokes, for lifeboats from 330 cubic feet up to 700 cubic feet capacity.

(3) *Size No. 3.* 15 gallons per minute at 50 double strokes, for lifeboats of 700 cubic feet or more capacity.

§ 160.044-3 General requirements.

(a) Bilge pumps shall be of rugged construction, of first class workmanship in every respect, and free from any defects affecting serviceability. Where a choice of materials is permitted, the materials used shall be mf eomd quality and suitable for the nurpose intended, and shall be corrosimn-resistant or protected against corrosion by acceptable means, except that parts subject to wear shall not depend upon coatings for corrosion resistance.

---

[1] A double stroke is a complete cycle from one extreme to the other and back again to the original starting point, or, for rotary type, one complete revolution.

[2] The capacity of a lifeboat for determining the size of the bilge pump shall be 0.6 times the product of the length, breadth, and depth of the lifeboat, in feet.

(b) Bilge pumps covered by this subpart shall be capable of operating against a head pressure of 20 pounds per square inch when tested in accordance with § 160.044-4(c).

(c) The bilge pump body shall be of bronze and shall be provided with a cover plate or plates, attached by means of wing nuts at least 1¼ inches long, on not more than 6 studs, or by means of a suitable bayonet type joint, so as to be readily removable for inspection or cleaning.

(d) The operating lever shall have a steel or bronze core through its entire length, but for comfort may have a gripping surface of wood or other suitable material. The lever shall be removable and shall be attached to the pump shaft which is to be square ended, by means of a set screw with 1¼-inch wings, and further shall be connected to the pump body or shaft end by a retaining chain to prevent loss.

(e) The suction line shall be fitted with an intake check valve and a suitable strainer. The strainer shall be removable for cleaning without the use of tools. The suction line shall contain no hose or fittings subject to collapsing when the pump is in service.

(f) Suction and discharge outlets shall be not less than 1 inch inside diameter for pump sizes Nos. 1 and 2, and not less than 1¼ inches inside diameter for pump size No. 3. Discharge outlets shall be provided with a tee of cast bronze or other corrosion-resistant material, with a removable plug at the top for priming, the plug to have a wing arrangement for removal by hand, and be secured to the tee by a retaining chain. The bottom of the tee shall have pipe threads to fit the discharge outlet of the pump, and the discharge portion of the tee shall be a plain clamp type male hose connection, with inside diameter not less than that of the pump discharge opening.

§ 160.044-4 Inspection and tests.

(a) *General.* Bilge pumps specified by this subpart are not inspected at regularly scheduled factory inspections, but the Commander of the Coast Guard District in which approved pumps are manufactured may detail an inspector at any time to check the facilities, materials and methods, and to conduct such tests as are necessary to satisfy himself that the pumps are being manufactured in compliance with this subpart, and in accordance with the manufacturers' plans and specifications as approved by the Commandant. The manufacturer shall provide a suitable place and the apparatus necessary for the use of the inspector in conducting tests.

(b) *Capacity.* The pump being tested shall be set up over a source of water for operation with all the required fittings and connections, the set-up to simulate an installation in a lifeboat. The pump shall be operated at the standard speed specified for its size, and the flow of water measured. The amount of water discharged shall not be less than that required by § 160.044-2(b).

(c) *Head pressure.* After the successful completion of the test outlined in paragraph (b) of this section, a pressure gage capable of registering 20 pounds per square inch, and a variable restriction, such as a nozzle, valve, etc., shall be fitted in the discharge line. The pump shall be put in operation with the discharge line open, and then the restriction shall be gradually closed until the pressure builds up to at least 20 pounds per square inch. This pressure shall be maintained for at least 15 seconds, after which the pump shall be disassembled and inspected. No destruction or deformation of parts sufficient to affect the serviceability of the pump shall be permitted as a result of this test.

(d) *Operating lever.* With the pump firmly secured in such a position that both the shaft and operating lever are in a horizontal position, apply a downward load of 200 pounds for a period of 5 minutes at the free end of the operating lever and perpendicular to its axis and the axis of the shaft. There shall be no slippage of the lever around the shaft, nor any evidence of permanent set or undue stress in any part of the pump. In cases where the design of the pump is such that this test may not be applicable to the complete pump, the pump shall be disassembled and the 200-pound load applied to the shaft and operating lever while the free end of the shaft is held in a vise or check so that both the shaft and the operating lever are in a horizontal position.

§ 160.044-5 Marking.

(a) Each pump shall be permanently and legibly marked, in letters not less than ¼ inch high, either cast or stamped on the body, with the name of the manufacturer, the size for which approved (USCG No. 1, 2 or 3), and the Coast Guard approval number. The tee required by § 160.044-3(f) shall be permanently and legibly marked with the word "PRIME HERE".

§ 160.044-6 Procedure for approval.

(a) *General.* Bilge pumps for lifeboats on board merchant vessels are approved only by the Commandant, U.S. Coast Guard, Washington, D.C., 20226 Correspondence relating to the subject matter of this specification shall be addressed to the Commander of the Coast Guard District in which the pumps are manufactured.

(b) *Manufacturer's plans.* In order to obtain approval, submit detailed plans and specifications, including a complete bill of material, assembly drawing, and parts drawings descriptive of the arrangement and construction of the pump and fittings, to the Commander of the Coast Guard District in which the factory is located. Each drawing shall have an identifying number, date, and an identification of the item; and the general arrangement or assembly drawing shall include a list of all drawings applicable, together with drawing numbers and alteration numbers. At the time of selection of the pre-approval sample, the manufacturer shall furnish the inspector four copies of all plans and specifications, corrected as may have been required, for forwarding to the Commandant. A copy of the approved plans and the certificate of approval shall be kept on file by the manufacturer.

(c) *Pre-approval sample.* After the first drawings and specifications have been examined and found to appear satisfactory, a marine inspector will be detailed to the factory to observe the production facilities and manufacturing methods and to obtain a pre-approval sample, which will be forwarded, prepaid by the manufacturer, to the Commandant for the necessary inspections and tests to determine compliance with this subpart for qualification for type or brand approval for use in life boats on board merchant vessels.

[CGFR 50-30, 16 FR 1085, Feb. 6, 1951, as amended by CGFR 65-16, 30 FR 10899, Aug. 21, 1965]

Subpart 160.047—Specification for a Buoyant Vest, Kapok or Fibrous Glass, Adult and Child

AUTHORITY: Secs. 6 and 17, 54 Stat. 164, as amended, 166, as amended; 46 U.S.C. 526e, 526p. Treasury Department Order 120, July 31, 1950, 15 FR 6521.

SOURCE: CGFR 65-37, 30 FR 11581, Sept. 10, 1965, unless otherwise noted.

§ 160.047-1 Incorporation by reference.

(a) *Specifications and Standards.* This subpart makes reference to the following documents:

(1) Federal Specification:

L-P-375C—Plastic Film, Flexible, Vinyl Chloride.

(2) Military specifications:

MIL-W-530—Webbing, Textile, Cotton, General Purpose, Natural or in Colors.

MIL-B-2766—Batt, Fibrous Glass, Lifesaving Equipment.

(3) Federal Standards:

No. 191—Textile Test Methods.

751A—Stitches, Seams, and Stitchings.

(4) Coast Guard specification:

164.003—Kapok, Processed.

(b) *Plans.* The following plans, of the issue in effect on the date buoyant vests are manufactured, form a part of this subpart:

Dwg. No. 160.047-1:

Sheet 1, Rev. 2—Cutting Pattern and General Arrangement, Models AK-1, and AF-1.

Sheet 2, Rev. 2—Cutting Pattern and General Arrangement, Models CKM-1 and CFM-1.

Sheet 3, Rev. 2—Cutting Pattern and General Arrangement, Models CKS-1 and CFS-1.
Sheet 4, Rev. 1—Pad Patterns.

(c) *Copies on file.* The manufacturer shall keep a copy of each specification and plan required by this section on file together with the certificate of approval. Plans and specifications may be obtained as follows:

(1) The Coast Guard plans and specifications may be obtained from the Coast Guard (MMT), Room 8301, 400 Seventh Street SW., Washington, D.C. 20590 or a recognized laboratory listed in § 160.047-6b.

(2) The Federal Specifications and Standard may be purchased from the Business Service Center, General Services Administration, Washington, D.C. 20407;

(3) The military specifications may be obtained from the Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, PA 19120.

[CGD 65-37, 30 FR 11581, Sept. 10, 1965, as amended by CGD 72-90R, 37 FR 10836, May 31, 1972; CGD 78-012, 43 FR 27153, 27154, June 22, 1978]

§ 160.047-2 Model.

Each buoyant vest specified in this subpart is a:

(a) Model AK-1, adult, kapok (for persons weighing more than 90 pounds);

(b) Model AF-1, adult, fibrous glass (for persons weighing more than 90 pounds);

(c) Model CKM-1, child medium, kapok (for children weighing from 50 to 90 pounds);

(d) Model CFM-1, child medium, fibrous glass (for children weighing from 50 to 90 pounds);

(e) Model CKS-1, child small, kapok (for children weighing less than 50 pounds); or

(f) Model CFS-1, child small, fibrous glass (for children weighing less than 50 pounds).

[CGD 72-163R, 38 FR 8119, Mar. 23, 1973]

§ 160.047-3 Materials.

(a) *General.* All materials used in the construction of buoyant vests shall be obtained from a supplier who furnishes an affidavit certifying that the material meets the requirements of the applicable reference specifications. The requirements for materials specified in this section are minimum requirements, and consideration will be given to the use of alternate materials in lieu of those specified. Detailed technical data and samples of all proposed alternate materials shall be submitted for approval prior to being incorporated in the finished product.

(b) *Kapok.* The kapok shall be all new material complying with Subpart 164.003 of this subchapter and shall be properly processed.

(c) *Fibrous glass.* The fibrous glass shall comply with the requirements of specification MIL-B-2766.

(d) *Envelope.* The buoyant vest envelope, or cover, shall be made from 39", 2.85 cotton jeans cloth, with a thread count of approximately 96 x 64. The finished goods shall weigh not less than 4.2 ounces per square yard, shall have a thread count of not less than 94 x 60, and shall have a breaking strength of not less than 85 pounds in the warp and 50 pounds in the filling. Other cotton fabrics having a weight and breaking strength not less than the above will be acceptable. There are no restrictions as to color, but the fastness of the color to laundering, water, crocking and light shall be rated "good" when tested in accordance with Federal Test Method Standard No. 191, Methods 5610, 5630, 5650, and 5660.

(e) *Pad covering.* The covering for the buoyant pad inserts shall be flexible vinyl film not less than 0.006" in thickness meeting the requirements of Federal Specification L-P-375 for Type I or II, class 1, film.

(f) *Tie tapes and body strap loops.* The tie tapes and body strap loops for an adult or child size buoyant vest specified by this subpart must be ¾-inch cotton webbing meeting the requirements in military specification MIL-T-43566 (Class I) for Type I webbing.

(f-1) *Body straps.* The complete body strap assembly, including hardware, must have a breaking strength of 150 pounds for an adult size and 115 pounds for a child size. The specifications for the webbing are as follows:

(1) For an adult size vest, the webbing must be 1 inch.

(2) For a child size vest, the webbing must be three-fourth inch and meet the requirements of military specification MIL-W-530 for Type IIa webbing.

(f-2) *Reinforcing tape.* The reinforcing tape around the neck of a buoyant vest specified by this subpart must be ¾-inch cotton tape weighing 0.18 ounce or more per linear yard and having a minimum breaking strength of 120 pounds.

(g) [Reserved]

(h) *Thread.* Each thread must meet the requirements for the specified type, class, and size of a Federal Specification listed in Table 160.001-2(j). Each cotton thread must be treated with a mildew inhibitor that is accepted by the Commandant (G-MMT-3). Only one kind of thread may be used in each seam.

[CGFR 65-37, 30 FR 11581, Sept. 10, 1965, as amended by CGD 72-90R, 37 FR 10836, May 31, 1972; CGD 73-130R 39 FR 20684, June 13, 1974; CGD 78-012; 43 FR 27154, June 22, 1978]

§ 160.047-3a Materials—Dee ring and snap hook assemblies and other instruments of closure for buoyant vests.

(a) *Specifications.* Dee ring and snap lock assemblies and other instruments of closure for buoyant vests may have decorative platings in any thickness and must meet the following specifications:

(1) The device must be constructed of inherently corrosion resistant materials. As used in this section the term "inherently corrosion resistant materials" includes, but is not limited to, brass, bronze, and stainless steel.

(2) The size of the opening of the device must be consistent with the webbing which will pass through the opening.

(b) *Testing requirements.* Dee ring and snap hook assemblies and other instruments of closure for buoyant vests must—

(1) Be tested for weathering. The Coast Guard will determine which one or more of the following tests will be used:

(i) Application of a 20 percent sodium-chloride solution spray at a temperature of 95° F (35° C) for a period of 240 hours in accordance with the procedures contained in method 811 of the Federal Test Method Standard No. 151.

(ii) Exposure to a carbon-arc weather-ometer for a period of 100 hours.

(iii) Submergence for a period of 100 hours in each of the following:

(*a*) Leaded gasoline.

(*b*) Gum turpentine.

(iv) Exposure to a temperature of 0°±5° F (−17.6±2.775° C) for 24 hours; and

(2) Within 5 minutes of completion of the weathering test required by paragraph (b)(1) of this section, the assembly must be attached to a support and bear 150 pounds for an adult size and 115 pounds for a child size for 10 minutes at the ambient temperatures without breaking or distorting.

[CGD 73-130R, 39 FR 20684, June 13, 1974]

§ 160.047-4 Construction.

(a) *General.* This specification covers buoyant vests which essentially consist of a vest-cut envelope containing compartments in which are enclosed pads of buoyant material arranged and distributed so as to provide the proper flotation characteristics and buoyancy required to hold the wearer in an upright backward position with head and face out of water. The buoyant vests are also fitted with tapes, webbing, and hardware to provide for proper adjustment and close and comfortable fit to the bodies of various size wearers.

(b) *Envelope.* The envelope or cover shall be cut to the pattern shown on Dwg. No. 160.047-1, Sheet 1, for adult size, and Sheets 2 and 3 for child sizes, and sewed with seams and stitching as shown on the drawing. Three compartments shall be formed to hold the buoyant pad inserts, two front compartments and one back compartment, and reinforcing strips of the same material as the cover shall be stitched to the inside of the front compartments in way of the strap attachments as shown by the drawings. As alternate construction, the front and/or back cover panels may be made in two pieces, provided that the two pieces are joined by a double stitched seam from the top center of the neck hole to the top of the vest as shown in Section J-J of the drawings.

(c) *Pad inserts*—(1) *Forming and sealing.* The buoyant pad inserts shall each be formed from two pieces of film cut to the patterns shown by Dwg. No. 160.047-1, Sheet 4, which shall be heat-sealed tight. The heat-sealed pad seams shall show an adhesion of not less than 8 pounds when 1 inch strips cut across and perpendicular to the seams are pulled apart at a rate of separation of the clamping jaws of the test machine of 12 inches per minute.

(2) *Kapok-filled pads for Models AK-1, CKM-1, and CKS-1.* The buoyant pad inserts for Models AK-1, CKM-1, and CKS-1 buoyant vests shall be filled with kapok distributed as provided in Table 160.047-4(c)(2).

TABLE 160.047-4(c)(2)—DISTRIBUTION OF KAPOK IN BUOYANT PAD INSERTS

	Model AK-1 (minimum)	Model CKM-1 (minimum)	Model CKS-1 (minimum)
	Ounces	*Ounces*	*Ounces*
Front pad (2) (each)	5.75	3.75	2.50
Back pad	4.00	2.50	2.00
Total	15.50	10.00	7.00

(3) *Fibrous glass-filled pads for Models AF-1, CFM-1, and CFS-1.* The buoyant pad inserts for Models AF-1, CFM-1, and CFS-1 buoyant vests shall be filled with fibrous glass distributed as provided in Table 160.047-4(c)(3).

TABLE 160.047-4(c)(3)—DISTRIBUTION OF FIBROUS GLASS IN BUOYANT PAD INSERTS

	Model AF-1 (minimum)	Model CFM-1 (minimum)	Model CFS-1 (minimum)
	Ounces	*Ounces*	*Ounces*
Front pad (2) (each)	10.25	6.75	4.50
Back	7.25	4.50	3.50
Total	27.75	18.00	12.50

(4) *Displacement of buoyant pad inserts.* The volume of the finished individual heat-sealed buoyant pad inserts shall be such as to provide buoyancy as set forth in Table 160.047-4(c)(4) when tested in accordance with the method set forth in § 160.047-5(e)(1), except that the pad covers shall not be slit open and the period of submergence shall be only long enough to determine the displacement of the pads.

TABLE 160.047-4(c)(4)—VOLUME DISPLACEMENT OF SEALED PADS

	Models AK-1 and AF-1	Models CKM-1 and CFM-1	Models CKS-1 and CFS-1
	Each	Each	Each
Front pads	6¼ pounds ± ¼ pound	4¼ pounds ± ¼ pound	2¾ pounds ± ¼ pound
Back pads	4¼ pounds ± ¼ pound	3¼ pounds ± ¼ pound	2½ pounds ± ¼ pound

(d) *Tie tapes.* The tie tapes at the neck shall finish not less than 12 inches in length for both adult and child size buoyant vests. They shall be arranged and attached to the envelope as shown by the drawings, and the free ends shall be doubled over and stitched in accordance with section H-H.

(e) *Body strap, hardware, and reinforcing tape.* The body strap, hardware, and reinforcing tape shall be arranged as shown on the drawings and attached to the envelope with the seams and stitching indicated.

(f) *Stitching.* All stitching shall be a short lock stitch conforming to Stitch Type 301 of Federal Standard No. 751, and there shall be not less than 7 nor more than 9 stitches to the inch. Both ends of the stitching forming the shoulder hinge seams and the top and bottom closing seams of the envelope shall be backstitched approximately ½ inch.

(g) *Workmanship.* Buoyant vests shall be of first-class workmanship and shall be free from any defects materially affecting their appearance or serviceability.

§ 160.047-5 Inspections and tests.[1]

(a) *General.* Manufacturers of listed and labeled buoyant vests shall—

(1) Maintain quality control of the materials used, the manufacturing methods and the finished product to meet the requirements of this subpart by conducting sufficient inspections and tests of representative samples and components produced;

(2) Make available to the recognized laboratory inspector and to the Coast Guard inspector, upon request, records of tests conducted by the manufacturer and records of materials used during production of the device including affidavits from suppliers; and

(3) Permit any examination, inspection, and test required by the recognized laboratory or the Coast Guard for a listed and labeled device, either at the place of manufacture, or some other location.

(b) *Lot size and sampling.* (1) A lot consists of 500 buoyant vests or fewer.

(2) A new lot begins after any change or modification in materials used or manufacturing methods employed;

(3) The manufacturer of the buoyant vests shall notify the recognized laboratory when a lot is ready for inspection;

(4) The manufacturer shall select samples in accordance with the requirements in Table 160.047-5(b)(4) from each lot of buoyant vests to be tested by the inspector in accordance with paragraph (e) of this section;

Table 160.047-5(b)(4)—Sample for Buoyancy Tests

Lot size	*Number of vests in sample*
100 and under	1
101 to 200	2
201 to 300	3
301 to 500	4

(5) The recognized laboratory must assign an inspector to a plant when notified that a lot is ready for inspection, to conduct tests and inspections on samples selected in accordance with paragraph (b)(4) of this section.

(6) If a vest fails the buoyancy test, the sample from the next succeeding lot must consist of 10 specimen vests or more to be tested for buoyancy in accordance with paragraph (e) of this section.

(c) *Additional tests.* An inspector from the recognized laboratory or the Coast Guard may conduct an examination, test, and inspection of a listed and labeled buoyant device that is obtained from the manufacturer or through commercial channels to determine its conformance to the applicable requirements.

(d) *Test facilities.* The manufacturer shall admit the laboratory inspector and the Coast Guard inspector to any part of the premises at the place of manufacture of a listed and labeled device to—

(1) Examine, inspect, or test a sample of a part or a material that is included in the construction of the device; and

(2) Conduct any necessary examination, inspection, or test in a suitable place and with appropriate apparatus provided by the manufacturer.

(e) *Buoyancy*—(1) *Buoyancy test method.* Remove the buoyant pad inserts from the vest and cut three slits each not less than 2 inches in length and not less than 2 inches apart on both sides of each pad. Securely attach the spring scale in a position directly over the test tank. Suspend the weighted wire basket from the scale in such a manner that the basket is weighed while it is completely under water. In order to measure the actual buoyancy provided by the pads, proceed as follows:

(i) Weigh the empty wire basket under water.

(ii) Place the pads inside the basket and submerge it so that the top of the basket is at least 2 inches below the surface of the water for 24 hours. The tank shall be locked or sealed during this 24-hour submergence period. It is important that after the pads have once been submerged they shall remain submerged for the duration of the test, and at no time during the course of the test shall they be removed from the tank or otherwise exposed to air.

---

[1] The manufacturer of a personal flotation device must meet 33 CFR 181.701 through 33 CFR 181.705 which require an instruction pamphlet for each device that is sold or offered for sale for use on recreational boats.

(iii) After the 24-hour submergence period unlock or unseal the tank and weigh the weighted wire basket with the pads inside while both are still under water.

(iv) The buoyancy is computed as (i) minus (iii).

(2) *Buoyancy required.* The pad inserts from adult buoyant vests shall provide not less than 16 pounds buoyancy; the pad inserts from child medium vests shall provide not less than 11 pounds buoyancy; and the pad inserts from child small vests shall provide not less than 7¼ pounds buoyancy.

(f) *Body strap test.* The complete body strap assembly, including hardware, shall be tested for strength by attaching the dee ring to a suitable support such that the assembly hangs vertically its full length. A weight as specified in § 160.047-3(f) shall be attached to the other end on the snap hook for 10 minutes. The specified weight shall not break or excessively distort the body strap assembly.

[CGFR 65-37; 30 FR 11581, Sept. 10, 1965, as amended by CGD 72-90R, 37 FR 10836, May 31, 1972; CGD 75-008, 43 FR 9772, Mar. 9, 1978.]

§ 160.047-6 Marking.

(a) Each buoyant vest must have the following information clearly marked in waterproof lettering that can be read at a distance of 2 feet:

Type II Personal Flotation Device.
Inspected and tested in accordance with U.S. Coast Guard regulations.
(Kapok or Fibrous glass) buoyant material provides a minimum buoyant force of (16 lb., 11 lb., or 7¼ lb.).
Dry out thoroughly when wet.
Do not snag or puncture inner plastic cover.
If pads become waterlogged, replace device.
Approved for use on all recreational boats and on uninspected commercial vessels less than 40 feet in length not carrying passengers for hire by persons weighing (over 90 lb., 50 to 90 lb., or less than 50 lb.).
U.S. Coast Guard Approval No. 160.047/(assigned manufacturer's No.)/(Revision No.); (Model No.).
(Name and address of manufacturer or distributor.).
(Lot No.).

(b) *Waterproof marking tags.* Marking for buoyant vests shall be sufficiently waterproof so that after 72 hours submergence in water, it will withstand vigorous rubbing by hand while wet without the printed matter becoming illegible.

[CGD 72-163R, 38 FR 8119, Mar. 28, 1973, as amended by CGD 75-008, 43 FR 9770, Mar. 9, 1978]

§ 160.047-6a Recognized laboratory.

To be designated a recognized laboratory, the laboratory must be—

(a) Operated as a nonprofit public service;

(b) Engaged regularly in the examination, testing, and evaluation of the safety of materials, installations, and devices for marine use; and

(c) Established in factory inspection and listing and labeling by having an existing program and standards for conducting, testing, and labeling buoyant vests that are acceptable to the Commandant.

[CGD 72-90R, 37 FR 10837, May 31, 1972]

§ 160.047-6b Designated recognized laboratory.

Underwriters' Laboratories, Inc., Marine Department, Tampa East Industrial Park, 2602 Tampa East Boulevard, Tampa, FL 33619 is a recognized laboratory.

[CGD 72-90R, 37 FR 10837, May 31, 1972]

§ 160.047-6c Compliance label.

If a recognized laboratory approves a buoyant vest, the device may carry the compliance label of the recognized laboratory.

[CGD 72-90R, 37 FR 10837, May 31, 1972]

§ 160.047-7 Procedure for listing and labeling.

(a) A recognized laboratory must inform each manufacturer that requests listing and labeling of a buoyant vest for use on a vessel of Class A, 1, or 2, not carrying passengers for hire, of the procedures for—

(1) Inspection;

(2) Examination;

(3) Tests; and

(4) The forwarding to the Coast Guard of the test report and the de-

scription of the quality control program of the requesting manufacturer.

(b) The cost of any examination, test, and inspection and the cost of listing and labeling must—

(1) Be paid by the manufacturer; and

(2) Be the same for similar services for each manufacturer if the service is similar.

(c) The Coast Guard reviews each test report and quality control procedure forwarded by the recognized laboratory to determine if the approval requirements have been met. After the review is completed, the Coast Guard—

(1) Notifies the laboratory that the device is approved or disapproved and if approved, listed and labeled; and

(2) Publishes notice of the approval in the FEDERAL REGISTER and Coast Guard publication CG-190.

(d) The Commandant, U.S. Coast Guard, determines all matters concerning approval requirements. The manufacturer or recognized laboratory may at any time request advice from the Commandant regarding these requirements.

[CGD 72-90R, 37 FR 10837, May 31, 1972]

§ 160.047-9 Termination of listing and labeling.

(a) The listing and labeling as a Coast Guard approved buoyant vest may be terminated, withdrawn, cancelled or suspended by—

(1) Written notice to the recognized laboratory from the Commandant; or

(2) Written notice to the manufacturer from the recognized laboratory or the Commandant.

(b) The listing and labeling as a Coast Guard approved buoyant vest may be terminated if—

(1) The manufacturer does not want to retain the service;

(2) The listed device is no longer manufactured;

(3) The manufacturer's program does not provide continued assurance of the quality of the listed and labeled device;

(4) The device no longer conforms to applicable requirements of the Coast Guard and the recognized laboratory; or

(5) The Coast Guard determines from the use of the device by the public or through other information that it is incapable of performing as a lifesaving device under the requirements of this subpart.

[CGD 72-90R, 37 FR 10837, May 31, 1972]

§ 160.047-10 Penalties.

A manufacturer that violates any of the approval requirements for listing and labeling but continues to mark the device as being U.S. Coast Guard approved is subject to the penalties contained in 14 U.S.C. 639.

[CGD 72-90R, 37 FR 10837, May 31, 1972]

Subpart 160.048—Specification for a Buoyant Cushion, Fibrous Glass

AUTHORITY: Secs. 6 and 17, 54 Stat. 164, as amended, 166, as amended, 46 U.S.C. 526e, 526p. Treasury Department Order 120, July 31, 1950, 15 FR 6521.

SOURCE: CGFR 65-37, 30 FR 11583, Sept. 10, 1965, unless otherwise noted.

§ 160.048-1 Incorporation by reference.

(a) *Specifications and Standards.* This subpart makes reference to the following documents:

(1) Military specification:

MIL-B-2766—Batt, Fibrous Glass, Lifesaving Equipment.

(2) Federal Specifications:

CCC-C-700G—Cloth, Coated, Vinyl, Coated (Artificial Leather).
CCC-C-426D—Cloth, Cotton Drill.
L-P-375C—Plastic Film, Flexible, Vinyl Chloride.

(3) Federal standard:

No. 751—Stitches, Seams, and Stitchings.

(4) Coast Guard specification:

164.003—Kapok, Processed.

(b) *Plan.* The following plan, of the issue in effect on the date kapok or fibrous glass buoyant cushions are manufactured, form a part of this subpart:

(1) Coast Guard Dwg. No. 160.048-1.

(c) *Copies on File.* Copies of the specifications and plan referred to in this section shall be kept on file by the manufacturer, together with the approved plans and certificate of approval. The Coast Guard specification and plan may be obtained upon request from the Commandant, United States Coast Guard, Washington, D.C. 20591, or recognized laboratory. The Federal Specifications and the Federal Standard may be purchased from the Business Service Center, General Services Administration, Washington; D.C. 20407. The Military Specification may be obtained from the Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, PA 19120.

[CGFR 65-37, 30 FR 11583, Sept. 10, 1965, as amended by CGFR 70-143, 35 FR 19962, Dec. 30, 1970; CGD 78-012, 43 FR 27153, 27154, June 22, 1978]

§ 160.048-2 Types and sizes.

(a) *Types.* Buoyant cushions shall be of the box type, i.e., have top, bottom and gusset. Pillow type cushions without a gusset are not acceptable.

(b) *Sizes.* Buoyant cushions shall have not less than 225 square inches top surface area; widths and lengths which fall within the dimensions shown in Tables 160.048-4(c)(1)(i) and 160.048-4(c)(1)(ii); and thickness not less than 2 nor more than 3 inches, the thickness to be considered as the finished width of the gusset between seams.

§ 160.048-3 Materials.

(a) *General.* All materials used in the construction of buoyant cushions shall be obtained from a supplier who furnishes an affidavit certifying that the material meets the requirements of the applicable specifications.

(b) *Kapok.* The kapok shall be all new material complying with Specification Subpart 164.003 of this subchapter and shall be properly processed.

(c) *Fibrous glass.* The fibrous glass shall comply with the requirements of specification MIL-B-2766.

(d) *Cover.* Cotton fabrics and coated upholstery cloth meeting the minimum requirements set forth in paragraphs (d) (1) and (2) of this section are acceptable for use as covers for buoyant cushions, but alternate materials will be given special consideration. Pro rata widths of like construction will be acceptable.

(1) *Cotton fabrics.* Cotton fabrics shall comply with the requirements of Federal Specification CCC-C-426 for Type I, Class 3 material.

(2) *Coated upholstery cloth.* Coated upholstery cloth shall comply with the requirements of Federal Specification CCC-A-700.

(e) *Pad covering.* The covering for the buoyant pad inserts shall be flexible vinyl film not less than 0.008 inch in thickness meeting the requirements of Federal Specification L-P-375 for Type I or II, Class 1, film.

(f) *Grab straps.* The grab straps shall be of materials permitted for the cover, or approved equivalent.

(g) *Thread.* Each thread must meet the requirements for the specified type, class, and size of a Federal Specification listed in Table 160.001-2(j). Each cotton thread must be treated with a mildew inhibitor that is accepted by the Commandant (G[MMT-3). Only one kind of thread may be used in each seam.

(h) *Welting.* The welting where used may be any fiber or plastic material suitable for the purpose.

[CG FR 65-37, 30 FR 11583, Sept. 10, 1965, as amended by CGD 78-012, 43 FR 27154, June 22, 1978]

§ 160.048-4 Construction and workmanship.

(a) *General.* This specification covers buoyant cushions of the box type filled with kapok or fibrous glass contained in heat-sealed vinyl film pad covers which are inserted in an outer cover fitted with grab straps. The primary purpose of such cushions is to provide buoyancy to aid a person in keeping afloat in the water. No hooks, snaps, or other means shall be included which might facilitate fastening the cushion to a boat. Buoyant cushions shall be of such size and volume as to provide not less than 20 pounds buoyancy when tested in the manner described in § 160.048-5(e), but no cushion providing less than 225 square inches of top surface area or measuring less than 2 inches or more than 3 inches in thickness will be acceptable.

(b) *Cover.* One piece of material each for the top and bottom shall be stitched together to form the cover except that piecing of the cover material will be allowed provided it is for decorative purposes only. Gusset or boxing materials shall be of not more than two pieces. If more than one piece of material is used for the top, bottom, boxing or gusset, they shall be attached by a double row of stitching of the type shown in Federal Standard No. 751, for seam types SSw-2 or LS(b)-2. The top and bottom may be of any of the materials permitted for the cover, but the boxing or gusset shall be a cotton fabric as specified by § 160.048-3(c)(1) or other equivalent material of a porous nature. Nonporous materials will not be permitted for the boxing or gusset, but coated upholstery cloth specified by § 160.048-3(d)(2), perforated to permit adequate draining and drying will be acceptable.

(c) *Buoyant material.* Buoyant cushions shall be filled with the minimum amounts of kapok or fibrous glass determined as follows:

(1) Rectangular buoyant cushions 2 inches thick shall be filled with the amounts of kapok or fibrous glass indicated for the various widths and lengths of such cushions by Table 160.048-4(c)(1)(i) or 160.048-4(c)(1)(ii), as applicable. Trapezoidal buoyant cushions 2 inches thick shall be filled with the amounts of kapok or fibrous glass indicated for the various widths and lengths of rectangular buoyant cushions by Table 160.048-4(c)(1)(i) or 160.048-4(c)(1)(ii) as applicable, on the basis that the length of a trapezoidal cushion shall be considered as its average length in each case.

TABLE 160.048-4(c)(1)(i)—WEIGHT OF KAPOK (IN OUNCES) FOR FILLING RECTANGULAR BUOYANT CUSHIONS 2 INCHES THICK

Length (inches)	Width (inches)													
	12	13	14	15	16	17	18	19	20	21	22	23	24	Over 24
15				20										
16				21	23									
17			21	23	24	26								
18		21	22	24	26	27	29							
19	20	22	24	25	27	29	30	32						
20	21	23	25	27	28	30	32	34	36					
21	22	24	26	28	30	32	34	35	37	39				
22	23	25	27	29	31	33	35	37	39	41	43			
23	25	27	29	31	33	35	37	39	41	43	45	47		
24	26	28	30	32	34	36	38	41	43	45	47	49	51	
25	27	29	31	33	36	38	40	42	44	47	49	51	53	(1)
26	28	30	32	35	37	39	42	44	46	49	51	53	55	(1)
27	29	31	34	36	38	41	43	46	48	50	53	55	58	(1)
28	30	32	35	37	40	42	44	47	50	52	55	57	60	(1)
29	31	34	36	39	41	44	46	49	52	54	57	59	62	(1)
30	32	35	37	40	43	45	48	51	53	56	59	61	64	(1)
31	33	36	39	41	44	47	50	52	55	58	61	63	66	(1)
32	34	37	40	43	46	48	51	54	57	60	62	65	68	(1)
33	35	38	41	44	47	50	53	56	59	62	64	67	70	(1)
34	36	39	42	45	48	51	54	57	60	63	66	69	73	(1)
35	37	40	44	47	50	53	56	59	62	65	68	72	75	(1)
36	38	42	45	48	51	54	58	61	64	67	70	74	77	(1)
Over 36	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)

[1] Determine amount of kapok from formula (1) contained in § 160.048-4(c)(2)

TABLE 160.048-4(c)(1)(ii)—WEIGHT OF FIBROUS GLASS (IN OUNCES) FOR FILLING RECTANGULAR BUOYANT CUSHION 2 INCHES THICK

Length (inches)	Width (inches)													
	12	13	14	15	16	17	18	19	20	21	22	23	24	Over 24
15				36										
16				38	41									
17			38	41	44	46								

TABLE 160.048-4(c)(1)(ii)—WEIGHT OF FIBROUS GLASS (IN OUNCES) FOR FILLING RECTANGULAR BUOYANT CUSHION 2 INCHES THICK—Continued

Length (inches)	Width (inches)													
	12	13	14	15	16	17	18	19	20	21	22	23	24	Over 24
18		37	40	43	46	49	52							
19	36	40	43	46	49	52	55	58						
20	38	42	45	48	51	54	58	61	64					
21	40	44	47	50	54	57	60	64	67	71				
22	42	46	49	53	56	60	63	67	70	74	77			
23	44	48	52	55	59	63	66	70	74	77	81	85		
24	46	50	54	58	61	65	69	73	77	81	84	88	92	
25	48	52	56	60	64	68	72	76	80	84	88	92	96	(1)
26	50	54	58	62	67	71	75	79	83	87	92	96	100	(1)
27	52	56	60	65	69	73	78	82	86	91	95	99	104	(1)
28	54	58	63	67	72	76	81	85	90	94	99	103	108	(1)
29	56	60	65	70	74	79	84	88	93	97	102	107	111	(1)
30	58	62	67	72	77	82	86	91	96	101	106	110	115	(1)
31	60	64	69	74	79	84	89	94	99	104	109	114	119	(1)
32	61	67	72	77	82	87	92	97	103	108	113	118	123	(1)
33	63	69	74	79	84	90	95	100	106	111	116	121	127	(1)
34	65	71	76	82	87	92	98	103	109	114	120	125	131	(1)
35	67	73	78	84	90	95	101	106	112	118	123	129	134	(1)
36	69	75	81	86	92	98	104	109	115	121	127	132	138	(1)
Over 36	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)

[1] Determine amount of fibrous glass from formula (2) contained in § 160.048-4(c)(2).

(2) All buoyant cushions more than 2 inches thick, and all buoyant cushions 2 inches thick which are of shapes different from those covered by paragraph (c)(1) of this section, shall be filled with kapok or fibrous glass as determined in the following formulas:

$$\text{Amount of kapok (ounces)} = A \times t \div 22.5 \quad (1)$$

$$\text{Amount of fibrous glass (ounces)} = A \times t \div 12.5 \quad (2)$$

Where:

A = Top surface area of cushion in square inches as determined from measurements taken along finished edges.

t = Thickness of boxing or gusset of finished cushion in inches.

(d) *Pad covers for buoyant material.* Before being inserted in the outer cover the buoyant material shall be placed in waterproof vinyl film pad covers which shall be heat-sealed tight. The heat-sealed pad seams shall show an adhesion of not less than 8 pounds when one inch strips cut across and perpendicular to the seams are pulled apart at a rate of separation of the clamping jaws of the test machine of 12 inches per minute. Each cushion shall contain not less than four pads and all pads in a cushion shall contain approximately equal portions of the total amount of buoyant material in the cushion. The buoyant material may be inserted directly into the vinyl film pad covers, or may first be packed in bags made of print cloth or other suitable material and then inserted into the vinyl film pad covers. The pads shall be of such size as to adequately fill the outer cover, and prior to sealing, the pads shall be evacuated of air sufficiently that when sat on the pads will not "balloon" excessively because of the pressure in the pad covers. For 15″ x 15″ x 2″ cushions the four vinyl film pad covers shall each be cut approximately 12″ wide x 12″ long or approximately 8″ wide x 18″ long shall have a sealed area of approximately 125 square inches; shall contain not less than 5 ounces of kapok or 9 ounces of fibrous glass each; and the volume displacement of the individual heat-sealed pad inserts shall be 5½ pounds each, plus or minus ½ pound, when tested in accordance with the method set forth in § 160.048-5(e)(1), except that the pad covers shall not be slit open, and the period of submergence shall be only long enough to determine the displacement of the pads.

(e) *Grab straps.* Grab straps shall be attached as shown on Dwg. No. 160.048-1 and shall finish 20 inches long and 1 inch wide at opposite ends.

The grab straps, if formed from cover material shall be folded and stitched together so as to produce a double thickness with raw edges turned under. Other means will be given special consideration.

(f) *Seams and stitching.* Seams shall be constructed with not less than a ⅜ inch border between the seam and the edge of the cover materials. All stitching shall be a lock stitch, 7 to 9 stitches per inch, except as follows: Chain stitching 6 to 8 stitches per inch, with 20/4 thread on top and 40/3 thread on the bottom, will be acceptable in constructing straps.

(g) *Workmanship.* All cushions shall be of first class workmanship and shall be free from defects materially affecting their appearance or serviceability. Cushions classified as "seconds" or "irregular" will not be acceptable under this specification.

§ 160.048-5 Inspections and tests.[1]

(a) *General.* Manufacturers of listed and labeled buoyant cushions shall maintain quality control of the materials used, manufacturing methods and the finished product so as to meet the applicable requirements, and shall make sufficient inspections and tests of representative samples and components produced to maintain the quality of the finished product. Records of tests conducted by the manufacturer and records of materials, including affidavits by suppliers that applicable requirements are met, entering into construction shall be made available to the recognized laboratory inspector or the Coast Guard inspector, or both, for review upon request. Any examinations, inspections and test which are required by the recognized laboratory for listed and labeled devices produced will be conducted by the laboratory inspector at the place of manufacture or other location at the option of the laboratory.

(b) *Lot size and sampling.* (1) A lot shall consist of not more than 1,000 buoyant cushions. A new lot shall be started with any change or modification in materials used or manufacturing methods employed. When a lot of buoyant cushions is ready for inspection, the manufacturer shall notify the recognized laboratory so that they may, at their discretion, assign an inspector to the plant for the purpose of making any tests and inspections deemed necessary. From each lot of buoyant cushions, the manufacturer or the recognized laboratory or U.S. Coast Guard inspector, when assigned, shall select samples in accordance with Table 160.048-5(b)(1) to be tested for buoyancy in accordance with paragraph (e) of this section.

TABLE 160.048-5(b)(1)—SAMPLING FOR BUOYANCY TESTS

Lot size	*No. of cushions in sample*
200 and under	1
201 to 400	2
401 to 600	3
601 to 1,000	4

(2) For a lot next succeeding one from which any sample cushion failed the buoyancy test, the sample shall consist of not less than 10 specimen cushions to be tested for buoyancy in accordance with paragraph (e) of this section.

(c) *Additional tests.* Unannounced examinations, tests and inspections of samples obtained either directly from the manufacturer or through commercial channels may be made to determine the suitability of a product for listing and labeling, or to determine conformance of a labeled product to the applicable requirements. These may be conducted by the recognized laboratory or the Coast Guard.

(d) *Test facilities.* The laboratory inspector, or the Coast Guard inspector, or both, shall be admitted to any place in the factory where work is being done on listed and labeled products, and either or both inspectors may take samples of parts or materials entering into construction of final assemblies, for further examinations, inspections, or tests. The manufacturer shall provide a suitable place and the apparatus necessary for the performance of the tests which are done at the place of manufacture.

---

[1] The manufacturer of a personal flotation device must meet 33 CFR 181.701 through 33 CFR 181.705 which require an instruction pamphlet for each device that is sold or offered for sale for use on recreational boats.

(e) *Buoyancy*—(1) *Buoyancy test method.* Remove the buoyant pad inserts from the cushion and cut three slits in the vinyl film, each not less than 6 inches in length on both sides of each pad. Securely attach the spring scale in a position directly over the test tank. Suspend the weighted wire basket from the scale in such a manner that the basket is weighed while it is completely under water. In order to measure the actual buoyance provided by the pads, the underwater weight of the empty basket should exceed the buoyancy of the pads. To obtain the buoyancy of the pads, proceed as follows:

(i) Weigh the empty wire basket under water.

(ii) Place the pads inside the basket and submerge it so that the top of the basket is at least 2 inches below the surface of the water for 24 hours. The tank shall be locked or sealed during this 24-hour submergence period. It is important that after the pads have once been submerged that they shall remain submerged for the duration of the test, and at no time during the course of the test shall they be removed from the tank or otherwise exposed to air.

(iii) After the 24-hour submergence period unlock or unseal the tank and weigh the weighted wire basket with the pads inside while both are still under water.

(iv) The buoyancy is computed as (i) minus (iii).

(2) *Buoyancy required.* The buoyant pads from the cushion shall provide not less than 20 pounds total buoyancy.

[CGFR 65-37, 30 FR 11585, Sept. 10, 1965, as amended by CGFR 70-143, 35 FR 19963, Dec. 30, 1970; CGD 78-008, 43 FR 9772, Mar. 9, 1978]

§ 160.048-6 Marking.

(a) Each buoyant cushion must have the following information clearly marked in waterproof lettering:

(1) In letters that can be read at a distance of 2 feet:

Type IV Personal Flotation Device.
Inspected and tested in accordance with U.S. Coast Guard regulations.
Dry out thoroughly when wet.
(Kapok or Fibrous glass) buoyant material provides a minimum buoyant force of 20 lb.
Do not snag or puncture inner plastic cover.
If pads become waterlogged, replace device.
Approved for use on recreational boats less than 16 feet in length and all canoes and kayaks, and only as a throwable device on all other recreational boats.
U.S. Coast Guard Approval No. 160.048/(assigned manufacturer's No.)/(Revision No.); (Model No.).
(Name and address of manufacturer or distributor.).
(Lot No.).
(Size; width, thickness, and length, including both top and bottom for trapezoidal cushions.).

(2) In letters that are distinctively set off or larger than all other marking, and are at least one-fourth of an inch in height:

WARNING: DO NOT WEAR ON BACK

(b) *Waterproofness of marking.* Marking for buoyant cushions shall be sufficiently waterproof so that after 72 hours submergence in water, it will withstand vigorous rubbing by hand while wet without the printed matter becoming illegible.

[CGFR 65-37, 30 FR 11585, Sept. 10, 1965, as amended by CGFR 70-143, 35 FR 19963, Dec. 30, 1970; CGD 72-163R, 38 FR 8119, Mar. 28, 1973; CGD 75-008, 43 FR 9771, Mar. 9, 1978]

§ 160.048-7 Procedure for approval.

(a) A recognized laboratory is one which is operated as a nonprofit public service and is regularly engaged in the examination, testing, and evaluation as to the safety of materials installations, and devices for marine use; which has an established factory inspection, listing, and labeling program; and which has standards for evaluating, listing, and labeling buoyant cushions which are acceptable to the Commandant, U.S. Coast Guard.

(b) Group approval. A single group approval will be granted to each manufacturer to cover all buoyant cushions which have materials and construction strictly in conformance with this subpart, which are 2 inches thick, and which are filled with kapok or fibrous glass in accordance with section 160.048-4(c)(1).

(c) Special approvals. Special approvals will be granted separately to each manufacturer for each kapok or fibrous glass buoyant cushion he proposes to manufacture which is not included under the group approval provided by paragraph (b) of this section, for example: A kapok or fibrous glass buoyant cushion having cover material not specifically provided for by this subpart; or any buoyant cushion more than 2 inches thick; or any buoyant cushion having a different shape.

(d) Private brand labels: Private brand labels are those bearing the name and address of a distributor in lieu of the manufacturer. In order for a manufacturer to apply for a group approval number or a special approval number to be used on such a private brand label, he shall forward a letter of request to the recognized laboratory, stating which cushions are involved, together with a letter from his distributor also requesting that approval be issued. The manfuacturer's request for approval, together with that of his distributor, will be forwarded to the Commandant and when deemed advisable, an approval number or numbers will be issued in the name of the distributor. Approvals issued to a distributor under such an arrangement shall apply only to cushions made by the manufacturer named on the certificate of approval, and this manufacturer shall be responsible for compliance of the cushion with the requirements of this subpart.

(e) A buoyant cushion is approved when it bears the compliance label of the recognized laboratory.

[CGFR 70-143, 35 FR 19963, Dec. 30, 1970, as amended by CGD 72-163R, 38 FR 8119, Mar. 28, 1973]

§ 160.048–7a Designated recognized laboratory.

Underwriters' Laboratories, Inc., Marine Department, Tampa East Industrial Park, 2602 Tampa East Boulevard, Tampa, FL 33619, is a recognized laboratory.

[CGD 72-163R, 38 FR 8119, Mar. 28, 1973]

§ 160.048–8 Procedure for listing and labeling.

(a) Manufacturers having buoyant cushions for use on vessels of classes A, 1 or 2 not carrying passengers for hire may make application for listing and labeling by addressing a request directly to a recognized laboratory. The laboratory will inform the submitter as to the requirements for inspection, examinations, and testing necessary for such listing and labeling. The costs in connection with the examinations, tests, inspections, listing, and labeling shall be the same for all manufacturers for the same or similar services and are to be borne by the manufacturer. The request shall include permission for the laboratory to furnish a complete test report together with a description of the quality control procedures to the Commandant, U.S. Coast Guard.

(b) The U.S. Coast Guard will review the test report and the quality control procedures to determine if the approval requirements have been met. If this is the case, the Commandant will notify the laboratory that the device is approved and that when the device is listed and labeled it may be marked as being U.S. Coast Guard approved. Notice of U.S. Coast Guard approval will be published in CG-190.

(c) If disagreements concerning procedural, technical or inspection questions arise over U.S. Coast Guard approval requirements, the opinion of the Commandant shall be requested by the laboratory.

(d) The manufacturer may at any time request clarification or advice from the Commandant on any question which may arise regarding manufacturing and approval of approved devices.

[CGFR 70-143, 35 FR 19964, Dec. 30, 1970]

§ 160.048–9 Termination of listing and labeling.

(a) Listing and labeling as buoyant cushions acceptable to the Commandant, U.S. Coast Guard, as approved may be terminated, withdrawn, canceled, or suspended by written notice to the manufacturer from the recognized laboratory or from the Commandant.

(b) The condition which may be the cause for termination of listing and labeling may be any of the following:

(1) When the manufacturer does not desire to retain the service.

(2) When the listed product is no longer being manufactured.

(3) When the manufacturer's own program does not provide suitable assurance of the quality of the listed and labeled product being manufactured.

(4) When the product manufactured no longer conforms to the current applicable requirements of the Coast Guard and the recognized laboratory.

(5) When service experience or laboratory or U.S. Coast Guard reports indicate a product is unsatisfactory.

[CGFR 70-143, 35 FR 19964, Dec. 30, 1970]

§ 160.048-10 Penalties.

All violations of the conditions for listing and labeling by a recognized laboratory are subject to the penalties provided by 14 U.S.C. 639.

[CGFR 70-143, 35 FR 19964, Dec. 30, 1970]

Subpart 160.049—Specification for a Buoyant Cushion Plastic Foam

AUTHORITY: Secs. 6 and 17, 54 Stat. 164, as amended, 166, as amended; 46 U.S.C. 526e, 526p. Treasury Department Order 120, July 31, 1950, 15 FR 6521.

SOURCE: CGFR 65-37, 30 FR 11586, Sept. 10, 1965, unless otherwise noted.

§ 160.049-1 Incorporation by reference.

(a) *Specifications and Standards.* This subpart makes reference to the following documents:

(1) Federal Specifications:

CCC-C-700G-Cloth, Coated, Vinyl, Coated (Artificial Leather).
CCC-C-426D-Cloth, Cotton Drill.

(2) Federal standard:

No. 751—Stitches, Seams, and Stitchings.

(3) Coast Guard specifications:

160.055—Life Preservers, Unicellular Plastic Foam, Adult and Child.
164.015—Plastic Foam, Unicellular, Buoyant, Sheet and Molded Shapes.

(4) *Military specifications.* MIL-C-43006—Cloth, Laminated, Vinyl-Nylon, High Strength, Flexible.

(b) *Plan.* The following plan, of the issue in effect on the date unicellular plastic foam buoyant cushions are manufactured, form a part of this subpart:

(1) Coast Guard Dwg. No. 160.049-1.

(c) *Copies on file.* Copies of the specifications and plan referred to in this section shall be kept on file by the manufacturer, together with the approved plans and certificate of approval. The Coast Guard specifications and plan may be obtained upon request from the Commandant, U.S. Coast Guard, Washington, D.C. 20591, or recognized laboratory. The Federal Specifications and the Federal Standard may be purchased from the Business Service Center, General Services Administration, Washington, D.C. 20407.

[CGFR 65-37, 30 FR 11586, Sept. 10, 1965, as amended by CGFR 70-143, 35 FR 19964, Dec. 30, 1970; CGD 72-163R, 38 FR 8119, Mar. 28, 1973; CGD 78-012, 43 FR 27153, 27154 June 22, 1978]

§ 160.049-2 Types and sizes.

(a) *Type.* Buoyant cushions shall be of the box type, i.e., have top, bottom, and gusset. Pillow type cushions without a gusset are not acceptable.

(b) *Sizes.* Buoyant cushions shall have not less than 225 square inches of top surface area, shall contain not less than 630 cubic inches of buoyant material, shall not be less than 2 inches thick, and shall have widths and lengths which fall within the dimensions shown in Table 160.049-4(c)(1).

§ 160.049-3 Materials.

(a) *General.* All materials used in the construction of buoyant cushions shall be obtained from a supplier who furnishes an affidavit certifying that the material meets the requirements of the applicable specifications.

(b) *Unicellular plastic foam.* The unicellular plastic foam shall be all new material complying with the requirements of Specification Subpart 164.015 for Type A or B foam.

(c) *Cover.* Cotton fabrics and coated upholstery cloth meeting the minimum requirements set forth in paragraphs (c) (1) and (2) of this section, are acceptable for use as covers for buoyant cushions. Vinyl-dip coating meeting the requirements set forth in paragraph (c)(3) of this section will also be acceptable. Alternate materials will be given special consideration. Pro rata widths of like construction will be acceptable.

(1) *Cotton fabrics.* Cotton fabrics shall comply with the requirements of Federal Specification CCC-C-426 for Type I, Class 3 material.

(2) *Coated upholstery cloth.* Coated upholstery cloth shall comply with the requirements of Federal Specification CCC-A-700.

(3) *Vinyl-dip.* The vinyl-dip coating shall comply with the coating requirements of section 160.055-5(b)(2) except there are no color restrictions.

(4) *Adhesive.* The adhesive shall be an all-purpose waterproof vinyl type. Minnesota Mining and Manufacturing Co. EC-870 or EC-1070, United States Rubber Co. M6256, Herculite Protective Fabrics Corp. CVV, Pittsburgh Plate Glass Co. R.828, or equal, are acceptable.

(5) *Reinforcing fabric.* The reinforcing fabric shall be type II, class I, laminated vinyl-nylon high strength cloth in accordance with the requirements of Specification MIL-C-43006.

(d) *Grab Straps.* The grab straps shall be of materials permitted for the cover, or approved equivalent.

(e) *Thread.* Each thread, except a thread of a grab strap, must meet the requirements for the specified type, class, and size of a Federal Specification listed in Table 160.001-2(j) or be a thread of equivalent size and strength that is accepted by the Commandant (G-MMT-3). Each cotton thread must be treated with a mildew inhibitor that is accepted by the Commandant (G-MMT-3). Only one kind of thread may be used in each seam.

(f) *Welting.* The welting where used may be of any fiber or plastic material suitable for the purpose.

[CGFR 65-37, 30 FR 11586, Sept. 10, 1965, as amended by CGFR 70-143, 35 FR 19964, Dec. 30, 1970; CGD 78-012, 43 FR 27154, June 22, 1978]

§ 160.049-4 Construction and workmanship.

(a) *General.* This specification covers buoyant cushions of the box type filled with unicellular plastic foam buoyant material. Such cushions consist essentially of a buoyant insert contained in an outer cover fitted with grab straps. The primary purpose of such cushions is to provide buoyancy to aid a person in keeping afloat in the water. Buoyant cushions providing less than 20 pounds buoyancy or less than 2 inches in thickness will not be acceptable.

(b) *Cover.* One piece of material each for the top and bottom shall be stitched together to form the cover except that piecing of the cover material will be allowed provided it is for decorative purposes only. Gusset or boxing materials shall be of not more than two pieces. If more than one piece of material is used for the top, bottom, boxing or gusset, they shall be attached by a double row of stitching of the type shown in Federal Standard No. 751, for Seam types SSw-2 or LSb-2. The top and bottom may be of any of the materials permitted for the cover, but the boxing or gusset shall be a cotton fabric as specified by § 160.049-3(b)(1) or other equivalent material of a porous nature. Nonporous materials will not be permitted for the boxing or gusset, but coated upholstery cloth specified by § 160.049-3(c)(2), perforated to permit adequate draining and drying will be acceptable.

(c) *Buoyant material.* A buoyant insert for a buoyant cushion must comply with the requirements in paragraph (c)(1) and (2) of this section and may be:

(1) Molded in one piece; or

(2) Built up from sheet material if it is formed from:

(i) Three pieces or less in each layer, cemented together with an all purpose vinyl adhesive such as or equivalent to U.S. Rubber No. M-6256 or Minnesota Mining No. EC-870 and No. EC-1070;

(ii) Three layers or less that may be cemented; and

(iii) Staggered butts and seams of adjacent layers.

(d) *Grab Straps.* Grab straps shall be attached as shown on Dwg. No.

160.049-1 and shall finish 20 inches long and 1 inch wide at opposite ends. The grab straps, if formed from cover material shall be folded and stitched together so as to produce a double thickness with raw edges turned under. Other means will be given special consideration.

(e) *Seams and stitching.* Seams shall be constructed with not less than a ⅜-inch border between the seam and the edge of the cover materials. All stitching shall be a lock stitch, 7 to 9 stitches per inch, except as follows: Chain stitching 6 to 8 stitches per inch with 20/4 thread on top and 40/3 thread on the bottom, will be acceptable in constructing grab straps.

(f) *Workmanship.* All cushions shall be of first class workmanship and shall be free from defects materially affecting their appearance or serviceability. Cushions classified as "seconds" or "irregular" will not be acceptable under this specification.

[CGFR 65-37, 30 FR 11586, Sept. 10, 1965, as amended by CGD 72-103R, 38 FR 8119, Mar. 28, 1973]

§ 160.049-5 Inspections and tests.[1]

(a) *General.* Manufacturers of listed and labeled buoyant cushions shall maintain quality control of the materials used, manufacturing methods and the finished product so as to meet the applicable requirements, and shall make sufficient inspections and tests of representative samples and components produced to maintain the quality of the finished product. Records of tests conducted by the manufacturer and records of materials, including affidavits by suppliers that applicable requirements are met, entering into construction shall be made available to the recognized laboratory inspector or the Coast Guard inspector, or both, for review upon request. Any examinations, inspections and tests which are required by the recognized laboratory for listed and labeled devices produced will be conducted by the laboratory inspector at the place of manufacture or other location at the option of the laboratory.

(b) *Lot size and sampling.* (1) A lot shall consist of not more than 1,000 buoyant cushions. A new lot shall be started with any change or modification in materials used or manufacturing methods employed. When a lot of buoyant cushions is ready for inspection, the manufacturer shall notify the recognized laboratory so that they may, at their discretion, assign an inspector to the plant for the purpose of making any tests and inspections deemed necessary. From each lot of buoyant cushions, the manufacturer or the recognized laboratory or U.S. Coast Guard inspector, when assigned, shall select samples in accordance with table 160.049-5(b)(1) to be tested for buoyancy in accordance with paragraph (e) of this section.

TABLE 160.049-5(b)(1)—SAMPLING FOR BUOYANCY TESTS

Lot size	*Number of cushions in sample*
200 and under	1
201 to 400	2
401 to 600	3
601 to 1,000	4

(c) *Additional tests.* Unannounced examinations, tests and inspections of samples obtained either directly from the manufacturer or through commercial channels may be made to determine the suitability of a product for listing and labeling, or to determine conformance of a labeled product to the applicable requirements. These may be conducted by the recognized laboratory or the U.S. Coast Guard.

(d) *Test facilities.* The laboratory inspector, or the Coast Guard inspector, or both, shall be admitted to any place in the factory where work is being done on listed and labeled products, and either or both inspectors may take samples of parts or materials entering into construction of final assemblies, for further examinations, inspections, or tests. The manufacturer shall provide a suitable place and the apparatus necessary for the performance of the tests which are done at the place of manufacture.

---

[1] The manufacturer of a personal flotation device must meet 33 CFR 181.701 through 33 CFR 181.705 which require an instruction pamphlet for each device that is sold or offered for sale for use on recreational boats.

(e) *Buoyancy*—(1) *Buoyancy test method.* Securely attach the spring scale in a position directly over the test tank. Suspend the weighted wire basket from the scale in such a manner that the basket is weighed while it is completely under water. In order to measure the actual buoyancy provided by the cushion, the underwater weight of the empty basket should exceed the buoyancy of the cushion. To obtain the buoyancy of the cushion, proceed as follows:

(i) Weigh the empty wire basket under water.

(ii) Place the cushion inside the basket and submerge it so that the top of the basket is at least 2 inches below the surface of the water for 24 hours. The tank shall be locked or sealed during this 24-hour submergence period. It is important that after the cushion has once been submerged that it shall remain submerged for the duration of the test, and at no time during the course of the test shall it be removed from the tank or otherwise exposed to air.

(iii) After the 24-hour submergence period unlock or unseal the tank and weigh the weighted wire basket with the cushion inside while both are still under water.

(iv) The buoyancy is computed as (i) minus (iii).

(2) *Buoyancy required.* Each cushion shall provide not less than 20 pounds buoyancy.

[CGFR 65-37, 30 FR 11587, Sept. 10, 1965, as amended by CGFR 70-143, 35 FR 19964, Dec. 30, 1970; CGD 75-008, 43 FR 9772, Mar. 9, 1978]

§ 160.049-6 Marking.

(a) Each buoyant cushion must have the following information clearly marked in waterproof lettering:

(1) In letters that can be read at a distance of 2 feet:

Type IV Personal Flotation Device.
Inspected and tested in accordance with U.S. Coast Guard regulations.
(Name of buoyant material) buoyant material provides a minimum buoyant force of 20 lb.
Dry out thoroughly when wet.
Approved for use on recreational boats less than 16 feet in length and all canoes and kayaks, and only as a throwable device on all other recreational boats.
U.S. Coast Guard Approval No. 160.049/(assigned manufacturer's No.)/(Revision No.); (Model No.).
(Name and address of manufacturer or distributor.).
(Lot No.).
(Size; width, thickness, and length, including both top and bottom for trapezoidal cushions.).

(2) In letters that are distinctively set off or larger than all other marking, and are at least one-fourth of an inch in height:

WARNING: DO NOT WEAR ON BACK

(b) *Waterproofness of marking.* Marking for buoyant cushions shall be sufficiently waterproof so that after 72 hours submergence in water, it will withstand vigorous rubbing by hand while wet without the printed matter becoming illegible.

[CGFR 65-37, 30 FR 11588, Sept. 10, 1965, as amended by CGFR 70-143, 35 FR 19964, Dec. 30, 1970; CGD 72-163R, 38 FR 8119, Mar. 28, 1973; CGD 75-008, 43 FR 9771, Mar. 9, 1978]

§ 160.049-7 Recognized laboratory.

(a) A recognized laboratory is one which is operated as a nonprofit public service and is regularly engaged in the examination, testing, and evaluation as the safety of materials installations, and devices for marine use; which has an established factory inspection, listing, and labeling program; and which has standards for evaluating, listing, and labeling buoyant cushions which are acceptable to the Commandant, U.S. Coast Guard.

(b) Group approval: A single group approval will be granted to each manufacturer to cover all buoyant cushions which have materials and construction strictly in conformance with this subpart, and which are in accordance with section 160.049-4(c)(1).

(c) Special approvals: Special approvals will be granted separately to each manufacturer for each unicellular plastic foam buoyant cushion he proposes to manufacture which is not included under the group approval provided for by paragraph (b) of this section, for example: a buoyant cushion having cover material not specifically provided for by this subpart, or any buoyant cushion having a different shape.

(d) Private brand labels. Private brand labels are those bearing the name and address of a distributor in lieu of the manufacturer. In order for a manufacturer to apply for a group approval number of a special approval number to be used on such a private brand label, he shall forward a letter of request to the recognized laboratory, stating which cushions are involved, together with a letter from his distributor also requesting that approval be issued. The manufacturer's request for approval, together with that of his distributor will be forwarded to the Commandant, and when deemed advisable, an approval number or numbers will be issued in the name of the distributor. Approvals issued to a distributor under such an arrangement shall apply only to cushions made by the manufacturer named on the certificate of approval, and this manufacturer shall be responsible for compliance of the cushions with the requirements of this subpart.

(e) A buoyant cushion is approved when it bears the compliance label of the recognized laboratory.

[CGFR 70-143, 35 FR 19964, Dec. 30, 1970, as amended by CGD 72-163R, 38 FR 8119, Mar. 28, 1973]

§ 160.049-7a Designated recognized laboratory.

Underwriters' Laboratories, Inc., Marine Department, Tampa East Industrial Park, 2602 Tampa East Boulevard, Tampa, FL 33619, is a recognized laboratory.

[CGD 72-163R, 38 FR 8119, Mar. 28, 1973]

§ 160.049-8 Procedure for listing and labeling.

(a) Manufacturers having buoyant cushions for use on vessels of classes A, 1 or 2 not carrying passengers for hire may make application for listing and labeling by addressing a request directly to a recognized laboratory. The laboratory will inform the submitter as to the requirements for inspection, examinations, and labeling. The costs in connection with the examinations, tests, inspections, listing, and labeling shall be the same for all manufacturers for the same or similar services and are to be borne by the manufacturer. The request shall include permission for the laboratory to furnish a complete test report together with a description of the quality control procedures to the Commandant, U.S. Coast Guard.

(b) The U.S. Coast Guard will review the test report and the quality control procedures to determine if the approval requirements have been met. If this is the case, the Commandant will notify the laboratory that the device is approved and that when the device is listed and labeled it may be marked as being U.S. Coast Guard approved. Notice of U.S. Coast Guard approval will be published in CG-190.

(c) If disagreements concerning procedural, technical or inspection questions arise over U.S. Coast Guard approval requirements, the opinion of the Commandant shall be requested by the laboratory.

(d) The manufacturer may at any time request clarification or advice from the Commandant on any question which may arise regarding manufacturing and approval of approved devices.

[CGFR 70-143, 35 FR 19965, Dec. 30, 1970]

§ 160.049-9 Termination of listing and labeling.

(a) Listing and labeling as buoyant cushions acceptable to the Commandant, U.S. Coast Guard, as approved may be terminated, withdrawn, canceled, or suspended by written notice to the recognized laboratory from the Commandant, or by written notice to the manufacturer from the recognized laboratory or from the Commandant.

(b) The condition which may be the cause for termination of listing and labeling may be any of the following:

(1) When the manufacturer does not desire to retain the service.

(2) When the listed product is no longer being manufactured.

(3) When the manufacturer's own program does not provide suitable assurance of the quality of the listed

and labeled product being manufactured.

(4) When the product manufactured no longer conforms to the current applicable requirements of the Coast Guard and the recognized laboratory.

(5) When service experience or laboratory or U.S. Coast Guard reports indicate a product is unsatisfactory.

[CGFR 70-143, 35 FR 19965, Dec. 30, 1970]

§ 160.049-10 Penalties.

All violations of the conditions for listing and labeling by a recognized laboratory are subject to the penalties provided by 14 U.S.C. 639.

[CGFR 70-143, 35 FR 19965, Dec. 30, 1970]

Subpart 160.050—Specification for a Buoy, Life Ring, Unicellular Plastic

AUTHORITY: R.S. 4417a, as amended, 4426, as amended, 4488, as amended, 4491, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, secs. 6, 17, 3, 54 Stat. 164, as amended, 166, as amended 347, as amended, sec. 3, 70 Stat. 152, sec. 4, 67 Stat. 462, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 404, 481, 489, 367, 526e, 526p, 1333, 390b, 43 U.S.C. 1333, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-15, Jan. 3, 1955, 20 FR 840; 167-20, June 18, 1956, 21 FR 4894; 167-38, Oct. 26, 1959, 24 FR 8857.

§ 160.050-1 Incorporation by reference.

(a) *Specifications and Standard.* This subpart makes reference to the following documents:

(1) Military specification:

MIL-R-16847—Ring buoy, lifesaving, unicellular plastic.

(2) Federal Specification:

V-T-295D-Thread, Nylon.

(3) Federal standard:

No. 595—Colors.

(4) Coast Guard specification:

164.015—Plastic foam, unicellular, buoyant, sheet and molded shape.

(b) *Copies on file.* Copies of the specifications referred to in this section shall be kept on file by the manufacturer, together with the certificate of approval. The Military Specification may be obtained from the Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, Pa., 19120. The Federal Specifications and Federal Standard may be obtained from the Business Service Center, General Services Administration, Washington, D.C. 20407. The Coast Guard specification may be obtained from the Commandant, U.S. Coast Guard, Washington, D.C. 20590.

[CGFR 66-64, 31 FR 562, Jan. 18, 1966, as amended CGD 72-163R, 38 FR 8120, Mar. 28, 1973; 38 FR 21784, Aug. 13, 1973; CGD 78-012, 43 FR 27153, 27154, June 22, 1978]

§ 160.050-2 Types and sizes.

(a) *Type.* Life buoys shall be of the annular ring type as described in this subpart, but alternate arrangements meeting the performance requirements set forth will be given special consideration.

(b) *Sizes.* Ring life buoys shall be of the sizes set forth in Table 160.050-2(b). A tolerance of a plus or minus 5 percent will be allowable on the dimensions indicated in Table 160.050-2(b).

TABLE 160.050-2(b)—SIZES AND DIMENSIONS OF RING LIFE BUOYS

Size	Dimensions (inches)			
	Finished ring		Cross section of body	
	Outside diameter	Inside diameter	Long diameter	Short diameter
30-inch	30	17	6½	3½
24-inch	24	13	5½	3
20-inch	20	11	4½	3½

[CGFR 54-46, 19 FR 8707, Dec. 18, 1954, as amended by CGFR 62-17, 27 FR 9045, Sept. 11, 1962]

§ 160.050-3 Materials.

(a) *General.* All exposed materials shall be resistant to oil or oil products, salt water and anticipated weather conditions encountered at sea.

(b) *Unicellular plastic.* The unicellular plastic material used in fabrication of the buoy body shall meet the requirements of Subpart 164.015 of this subchapter for Type C material. The buoy's body shall be finished with two coats of vinyl base paint. The ring life buoys shall be either international orange (Color No. 12197 of Federal Standard 595) or white in color and the colorfastness shall be rated "good" when tested in accordance with Federal Test Method Standard No. 191 Methods 5610, 5630, 5650, and 5660.

(NOTE: On vessels on an international voyage, all ring life buoys shall be international orange in color.)

(c) *Grab line.* The grab line shall be ⅜-inch diameter polyethylene, polypropylene, or other suitable buoyant type synthetic material having a minimum breaking strength of 1,350 pounds.

(d) *Beckets.* The beckets for securing the grab line shall be 2-inch polyethylene, polypropylene, nylon, saran or other suitable synthetic material having a minimum breaking strength of 585 pounds. In addition, polyethylene and polypropylene shall be weather-resistant type which is stabilized as to heat, oxidation, and ultraviolet light degradation.

(e) *Thread.* Each thread must meet the requirements of Federal Specification V-T-295 for nylon thread. Type II, Class A, Number size 4; or be a thread of equivalent size and strength that is accepted by the Commandant (G-MMT-3).

[CGFR 65-9, 30 FR 11477, Sept. 8, 1965, as amended by CGFR 65-64, 31 FR 562, Jan. 18, 1966; CGD 78-012, 43 FR 27154, June 22, 1978]

§ 160.050-4 Construction and workmanship.

(a) *General.* This specification covers ring life buoys which provide buoyancy to aid in keeping persons afloat in the water. Each buoy consists of a body constructed in the shape of an annular ring, with an approximately elliptical body cross section and which is fitted with a grab line around the outside periphery. The outside and inside diameters of the ring and the length and width of the cross section of the body shall be uniform throughout.

(b) *Body.* The body shall be made in either one or two pieces. If of two pieces, the pieces shall be equal in size and shall be adhesive bonded along a center line through an axis passing through the flat area dimension of the body. The adhesive shall be a liquid cold setting, polymerizable, nonsolvent, containing material of the phenolepichlorhydrin type or equivalent having good strength retention under outdoor weathering conditions.

(c) *Grab line.* The finished length of the grab line shall be four times the outside diameter of the buoy. The ends of the grab line shall be securely and neatly spliced together, or shall be hand whipped with a needle and both ends securely and smoothly seized together. The grab line shall encircle the buoy and shall be held in place by the beckets. The spliced or seized ends of the grab line shall be placed in the center of the width of one of the beckets.

(d) *Beckets.* Each ring buoy shall be fitted with four beckets located at equidistant points about the body of the buoy. The beckets shall be passed around the body of the buoy with the free ends to the outside, and shall be securely cemented to the buoy with a suitable waterproof adhesive which is compatible with the unicellular plastic used in the buoy body. The ends of the beckets shall be turned under at least 1 inch, one end to go around the grab line, and the other to be laid flat against the first end. The beckets shall then be stitched to the grab line with not less than five hand stitches made with two parts of thread or machined stitched with not less than three stitches per inch. Alternate methods for rigging beckets and grab line will be given special consideration.

(e) *Weight.* The weight of the completely assembled buoy shall be not less than 2.5 pounds and not more than 4.25 pounds for the 20-inch size, not less than 3.0 pounds and not more than 5.5 pounds for the 24-inch size, and not less than 5.0 and not more than 7.5 pounds for the 30-inch size.

(f) *Workmanship.* Ring life buoys shall be of first class workmanship and free from any defects materially affecting their appearance or serviceability.

[CGFR 54-46, 19 FR 8707, Dec. 18, 1954, as amended by CGFR 62-17, 27 FR 9045, Sept. 11, 1962; CGFR 65-9, 30 FR 11477, Sept. 8, 1965]

§ 160.050–5 Sampling, tests, and inspection.[1]

(a) *General.* A marine inspector shall examine all ring life buoys at the place of manufacture for compliance with this specification. Ring life buoys on a lot basis shall be tested for strength, resistance to damage, and buoyancy in accordance with the methods set forth in paragraphs (c), (d), and (e) respectively of this section with the exception that the test for resistance to damage may be omitted at the discretion of the marine inspector. If the marine inspector has any doubt regarding compliance with this specification, he may make such other examinations and tests as he may deem necessary. The manufacturer shall provide a suitable place and necessary apparatus for the use of the marine inspector in conducting tests at the place of manufacture, and shall provide labor for all handling of ring buoys requisite to inspection.

(b) *Lot size and sampling.* A lot shall consist of not more than 500 ring life buoys. A new lot shall be started with any change or modification in material used or manufacturing methods employed. When a lot of ring buoys is ready for inspection, the manufacturer shall notify the Commander of the Coast Guard District in which the factory is located, who will assign a marine inspector to the plant for the purpose of making the necessary tests and inspections. From each lot of ring life buoys the marine inspector shall select samples in accordance with the following Table 160.050-5(b) to be tested for strength and buoyancy in accordance with paragraphs (c) and (e) respectively of this section:

TABLE 160.050-5(b)—SAMPLING FOR TESTS

Lot size	Number of ring buoys in sample
100 and under	1
101 to 200	2
201 to 300	3
301 to 500	4

(c) *Strength test.* The buoy body shall be suspended by a 2-inch-wide strap. A similar strap shall be passed around the opposite side of the buoy and a 200-pound weight suspended by it from the buoy. After 30 minutes, the buoy body shall be examined, and there shall be no breaks, cracks or permanent deformation.

(d) *Resistance to damage test.* The buoy body shall be dropped three times from a height of 6 feet onto concrete, and there shall be no breaks or cracks in the body.

(e) *Buoyancy*—(1) *Buoyancy test method.* To obtain the buoyancy of the buoy, proceed as follows:

(i) Weigh iron or other weight under water. The weight shall be more than sufficient to submerge the buoy.

(ii) Attach the iron or other weight to the buoy and submerge with the top of the buoy at least 2 inches below the surface for 48 hours.

(iii) After the 48-hour submergence period, weigh the buoy with the weight attached while both are still under water.

(iv) The buoyancy is computed as paragraph (e)(1)(i) minus paragraph (e)(1)(iii) of this section.

(2) *Buoyancy required.* The buoys shall provide a buoyancy of not less than 16½ pounds for the 20- and 24-inch sizes, and not less than 32 pounds for the 30-inch size.

(f) *Lot acceptance and rejection.* When the marine inspector has satisfied himself that the ring life buoys in the lot are of a type officially approved in the name of the company, and that such ring life buoys meet the requirements of this specification, he may complete the name plate described in § 160.050-6 with the necessary information. If any ring life buoys are found unsatisfactory, they or the entire lot may be rejected at the discretion of the marine inspector. Rejected individual ring life buoys or the entire lot may be re-worked and re-submitted for inspection at the discretion of the District Commander.

---

[1] The manufacturer of a personal flotation device must meet 33 CFR 181.701 through 33 CFR 181.705 which require an instruction pamphlet for each device that is sold or offered for sale for use on recreational boats.

[CGFR 65-9, 30 FR 11478, Sept. 8, 1965, as amended by CGD 75-008, 43 FR 9772, Mar. 9, 1978]

§ 160.050-6 Marking.

(a) Each ring buoy must have the following information in waterproof lettering:

Type IV Personal Flotation Device.
Inspected and tested in accordance with U.S. Coast Guard regulations.
(Name of buoyant material) buoyant material provides a minimum buoyant force of (32 lb. or 16½ lb.).
Approved for use on recreational boats less than 16 feet in length and all canoes and kayaks, and only as a throwable device on all other vessels.
U.S. Coast Guard Approval No. 160.050/(assigned manufacturer's No.)/(Revision No.); (Model No.).
(Name and address of manufacturer or distributor).
(Size).
USCG (Marine Inspection Office identification letters).
(Lot No.).

(b) A method of marking that is different from the requirements of paragraph (a) of this section may be given consideration by the Coast Guard.

(46 U.S.C. 375, 416; 49 U.S.C. 1655(b); 49 CFR 1.4(b), and 1.46)

[CGD 72-163R, 38 FR 8120, Mar. 28, 1973, as amended by CGD 75-186, 41 FR 10437, Mar. 11, 1976; CGD 75-008, 43 FR 9771, Mar. 9, 1978; 43 FR 10913, Mar. 16, 1978]

§ 160.050-7 Procedure for approval.

(a) *General.* Ring life buoys for use on merchant vessels or motorboats are approved only by the Commandant, U.S. Coast Guard, Washington, D.C., 20590. Correspondence relating to the subject matter of this specification shall be addressed to the Commander of the Coast Guard District in which the factory is located.

(b) *Pre-approval tests.* Manufacturers who desire to manufacture unicellular plastic ring life buoys complying with this specification shall apply to the Commander of the Coast Guard District in which the plant is located, who will detail a marine inspector to the plant to observe production facilities and manufacturing methods and to select from not less than 6 of each size ring life buoy for which approval is desired, a sample of not less than two specimen buoys of each size on which he shall conduct strength, resistance to damage, and buoyancy tests in accordance with § 160.050-5(c), (d), and (e), and make such other examinations and tests as may be necessary to satisfy himself that the specimen buoys are in accordance with this specification. Upon completion of satisfactory tests, the marine inspector's report will be forwarded to the Commandant for assignment of an official approval number for each size.

[CGFR 54-46, 19 FR 8707, Dec. 18, 1954, as amended by CGFR 65-9, 30 FR 11478, Sept. 8, 1965; CGD 78-012, 43 FR 27154, June 22, 1978]

Subpart 160.051—Inflatable Liferafts

AUTHORITY: R.S. 4488, as amended, R.S. 4491, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, sec. 3, 70 Stat. 152, sec. 3, 68 Stat. 675; 46 U.S.C. 481, 489, 367, 390b, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1959, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-20, June 18, 1956, 21 FR 4894; CGFR 56-28, July 24, 1956, 21 FR 5659; 167-38, Oct. 26, 1959, 24 FR 8857.

§ 160.051-1 Applicable specifications.

(a) *Specifications.* The following specifications, of the issue in effect on the date inflatable liferafts are manufactured, form a part of this subpart for guidance purposes only:

(1) *Military specifications:*

MIL-L-19496 (Ships)—Lifeboat, CO_2 inflatable Mark 5, 15-person capacity.
MIL-C-17415 (Ships)—Cloth, coated, and webbing, inflatable boat and miscellaneous use.

(b) *Copies on file.* Copies of the specifications referred to in this section, as well as the various reference specifications forming a part thereof, shall be kept on file by the manufacturer, together with the approved plans, specifications, and certificate of approval. They shall be kept for a period consisting of the duration of approval and 5 years after termination of approval, except that the approval certificate shall be returned for cancellation immediately following the termination date. The Military Specifications may be obtained from the Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, Pa. 19120.

(c) Permissible extension. Manufacturers of inflatable liferafts having approval numbers 160.051/49 or lower may continue to manufacture rafts under the terms of that approval until 1 January 1975. Those manufacturers having approval numbers 160.051/50 or higher shall comply with the requirements of this subpart.

[CGFR 65-9, 30 FR 11478, Sept. 8, 1965, as amended by CGD 73-160R, 39 FR 9669, Mar. 13, 1974]

§ 160.051-2 Alternate construction.

(a) *Requirements.* Inflatable life rafts or components which differ from the requirements set forth in this specification may be given consideration for approval provided:

(1) The manufacturer can demonstrate that the raft or component has at least three years of successful operational experience which has been accumulated in marine atmospheres at sea in frigid as well as tropic conditions, or by tests which are the equivalent thereof.

(2) Complete detail plans and specifications are submitted.

(3) The raft can pass the tests outlined in § 160.051-5.

(4) The manufacturer has arranged for maintenance and servicing in accordance with § 160.051-6.

[CGFR 59-26, 24 FR 5545, July 9, 1959]

§ 160.051-3 Type and sizes.

(a) *Definition.* An inflatable liferaft is defined as meaning an abandon-ship flotation appliance designed to support a specified number of persons clear of the water, which is stowed in a folded or collapsed condition and is capable of withstanding severe launching shock and which is inflated by gas or air into a raft designed for rugged service.

(b) *Sizes.* Inflatable liferafts shall be not less than 4 (6 for vessels on international voyages) nor more than 25-person sizes. An inflatable liferaft, complete with case and required emergency equipment, shall not weigh more than 400 pounds.

[CGFR 59-26, 24 FR 5545, July 9, 1959, as amended by CGFR 65-9, 30 FR 11478, Sept. 8, 1965]

§ 160.051-4 Design.

(a) *General.* Inflatable liferafts may be circular, octagonal, elliptical or boat shaped and the design shall incorporate the material and construction details outlined in Military Specification MIL-L-19496 for guidance. All materials used in the construction of inflatable liferafts shall be of good quality and suitable for the purpose intended, and shall not be subject to undue deterioration from the effects of weathering aboard ship under the conditions of usual stowage, nor from contact with salt water or spray or petroleum products. Where dissimilar materials are used in combination, provision shall be made to prevent such deleterious effects as loosening or tightening due to differences in thermal expansion, freezing or buckling of parts, galvanic corrosion, or other forms of contamination. Consideration may be given to materials and construction which differ from those required by Military Specification MIL-L-19496 if it can be shown by tests and/or other means that the proposed material or construction is at least as suitable for the intended use.

(b) *Body.* The bottom of the raft shall be waterproof and fitted with an inflatable floor which can be inflated or deflated as desired. A life line festooned in bights shall be provided around the periphery of the liferaft. A boarding ladder and towing connection shall be fitted at each end of the liferaft. Suitable pockets or equivalent shall be fitted for stowage of hand pumps, repair kits, instruction manuals and other equipment needed immediately on launching. Reinforcing patches shall be substantially fitted in way of the attachments for the righting line, painter, sea anchor line, etc. The holders for retaining the gas or air pressure containers shall be substantially fitted and sufficiently strong to retain the containers when the raft is inflated or when the raft is dropped into the water. All exposed surfaces shall be reasonably smooth and free from sharp protrusions or projections which might be injurious in boarding or occupancy. Water pockets to improve stability and reduce drifting shall be fitted on the underside of the floor.

(c) *Canopy.* The design shall incorporate an inner and outer canopy to insulate the occupants from the weather which shall become automatically erected upon initial inflation of the raft. The canopy shall provide adequate headroom and provision shall be made for furling the ends to allow entry of occupants, free passage of air, and adequate room for paddling. Provision for catching rain water shall be incorporated in the canopy.

(d) *Laps and seams.* The amount of lap shall be sufficient to make the seams as strong as the coated cloth joined and the seams shall be required to withstand a test load equal to the coated cloth tensile strength.

(e) *Color.* The outside of the canopy shall be colored Indian orange (Cable No. 70072, Standard Color Card of America) or other color of high conspicuity against a background of a white-capped sea. The remainder of the raft may be the natural color of the finished coated cloth, except that the underside of the floor shall be dark blue, dark grey or black.

(f) *Containment.* For each type of raft, manufacturers shall design and provide suitable containment constructed so as to be capable of withstanding hard wear under conditions encountered at sea. A liferaft in its container shall be inherently buoyant and shall be arranged so as to display evidence of use or tampering, such as by the use of a suitable seal, or equivalent. The arrangement shall be such that if the vessel sinks, the raft will float free and inflation will take place automatically. The "Instructions for Inflation" requirement of § 160.051-8(b) shall consist of brief instructions for manually launching and inflating a raft. These instructions shall be legibly printed on material that is durable, water and wear resistant. These instructions shall be permanently attached to the exterior of each raft container in two locations, one on each side of the container.

(1) *Rigid container.* The container shall be constructed of metal, wood, or plastic, and shall be capable of being securely fastened aboard ship and arranged for quick release of the liferaft. The container shall be weathertight except that provision shall be made for drainage and the circulation of air. A container shall have an interior surface smooth and free from splinters, barbs, or rough projections. The interior surface of a container made of fibrous glass reinforced plastic shall be finished with a gel coating. The words "This Side Up" shall be shown on the exterior of a container on the side opposite the drain holes in blocked letters 1 inch in size. Rigid containers shall be the normal means of containing inflatable liferafts except for the installations provided for in paragraph (f)(2) of this section.

(2) *Fabric container.* A fabric container shall be made of coated fabric in accordance with Military Specification MIL-C-17415. All fasteners and hardware shall be made of noncorrosive metal. Fabric containers shall be provided with carrying handles, nameplates and markings in accordance with § 160.051-8. Fabric containers may be used with liferafts that are reinforced for suspension as described in paragraph (j) of this section to operate in conjunction with certain approved launching devices.

(g) *Inflation.* Inflation shall take place upon the pulling of a lanyard or by some equally simple means which may be accomplished manually both from the deck of a vessel and by a swimmer in the water. In addition, inflation connections shall be provided for use with the hand pump of § 160.051-7(b)(9).

(h) *Buoyancy.* The principal buoyancy shall be located at the periphery of the inflatable liferaft and shall be subdivided into not less than two compartments, either of which must be capable of supporting the rated number of persons out of the water. Where more than two compartments are incorporated in the design, the raft shall be capable of supporting the rated number of persons out of the water with one-half of the compartments deflated. In either case, the deflation of any one compartment shall not unduly jeopardize the stability of the raft.

(i) *Capacity.* The maximum number of persons for which an inflatable liferaft may be rated shall be the overall horizontal clear area inside the raft in square feet (including thwarts if fitted) divided by 4, or the volume of the principal buoyancy compartments in cubic feet (which for this purpose shall not include the arches, canopy supports, or thwarts) divided by 3.4, whichever is the lesser.

(j) *Launching reinforcement.* Any liferaft which is to be suspended from or operated in conjunction with an approved launching device such that any of the raft's components are subjected to loads and stresses in addition to those of its inflation system or normal waterborne loading, shall be suitably reinforced with load carrying lines, slings, netting or their equivalents. These reinforcements shall be designed with a minimum factor of safety of 6 on the ultimate strength of the reinforcement based on the raft's normal carrying capacity.

[CGFR 59-26, 24 FR 5545, July 9, 1959, as amended by CGFR 65-9, 30 FR 11478, Sept. 8, 1965; CGD 72-133R, 37 FR 17040, Aug. 24, 1972]

§ 160.051-5 Inspections and tests.

(a) *General.* Whenever any work is being done on components or the assembly of inflatable liferafts, the manufacturer shall notify the Commander of the Coast Guard District in which the factory is located in order that he may assign a marine inspector to the factory to witness the applicable tests and satisfy himself that the quality assurance program of the manufacturer is satisfactory.

(1) The marine inspector shall be admitted to any place in the factory where work is done on the inflatable liferafts or component parts or materials, and he may take samples of parts or materials entering into construction for further inspections or tests. The manufacturer shall provide a suitable place and the apparatus necessary for the performance of the tests to be witnessed by the marine inspector.

(2) Tests at commercial or government laboratories, when applicable, shall be at the expense of the manufacturer. Suitable material affidavits or invoices for essential materials entering into construction shall be obtained by the manufacturer from his suppliers and he shall maintain a file showing the lot numbers of the inflatable liferafts for which such materials were used.

(b) *Lot size.* A lot shall consist of not more than 50 inflatable liferafts of the same design and size. Lots shall be numbered serially by the manufacturer and if at any time during the processing of a lot, any change or modification in materials or production methods is made, a new lot shall be started.

(c) *Routine inspections and tests.* Manufacturers of approved inflatable liferafts shall maintain quality control of the materials used, manufacturing methods, workmanship, and the finished product, and shall make full inspections and tests as necessary to maintain the quality of the product. The fact that certain tests are required as enumerated below does not relieve the manufacturer from making any and all other tests, inspections, or other determinations as may be necessary to assure the quality of all materials, parts and the finished product. The following inspections and tests shall be conducted by the manufacturer in the presence of the marine inspector, and records of such tests shall be kept on file by the manufacturer for a period of 5 years and shall be made available to the Coast Guard marine inspector upon demand:

(1) *Inspection.* Each completed inflatable liferaft shall, in addition to all other inspections during process of fabrication or testing, receive 100 percent visual inspection for surface defects, obvious mis-arrangements or dimensional non-conformance, and for general conformance to the applicable requirements of the manufacturer's approved plans and specifications, and non-conforming units shall be rejected.

(2) *Over-pressure test.* Each raft shall be individually tested by inflating with air to 2.5 times its working pressure and allowed to stand for 10 minutes. At the end of 10 minutes the

raft shall not show signs of seam slippage or rupture nor shall the pressure decrease by more than 5 percent. Relief valves, if fitted, shall be made inoperable for this test and each valve shall be tested to determine that it relieves the pressure at not more than 140 percent of the designed working pressure and will reseat at the designed working pressure. Upon completion of this test, the raft shall immediately be subjected to the test required by paragraph (c)(3) of this section.

(3) *Working pressure leakage test.* Each principal buoyancy compartment as well as other inflated compartments of every liferaft shall be individually tested for gas-tight integrity by inflating with air to its working pressure, allowed to stand one hour, and then checked and readjusted as necessary to the original working pressure. After standing 6 hours the pressure shall not have decreased by more than 10 percent, compensation being made for the difference in temperature and barometric pressure. During the test more than one compartment may be tested at one time, but adjacent compartments shall be opened to the atmosphere during the test.

(4) *Inflation test.* For lots of less than 30, one specimen shall be tested. For lots of at least 30, but not more than 50, two specimens shall be tested. The specimens shall be selected at random from the lot after the rafts have been folded and packed in their containers with equipment. When the directions on the container are followed, the specimen shall break free from its container and inflate each principle buoyancy compartment on the periphery of the raft to the designed shape and approximate dimensions in not more than 30 seconds at 70° F. At the end of this 30 seconds interval, the canopy support tubes are not required to be fully erect. The specimen shall reach its designed working pressure with the canopy fully erect in not more than 1 minute 30 seconds after the first inflation valve is operated. The specimen shall be allowed to stand for 1 hour to allow the gases inside to come to room temperature. The pressure in all the principal buoyancy compartments shall be approximately the designed working pressure. If the specimen(s) fails this test the entire lot shall be subjected to the inflation test.

(d) *Lot acceptance or rejection.* When the inspections and tests prescribed by paragraphs (a), (b), and (c) of this section, above have been completed satisfactorily and all nonconforming units eliminated, and the inflatable liferafts comprising the lot are considered suitable, the lot shall be accepted, and the containers shall be marked in accordance with § 160.051-8(a).

(e) *Preapproval inspection and tests.* The prototype raft shall be inspected and tested at the plant of the manufacturer in the presence of a marine inspector in accordance with paragraph (c) (1) through (4) of this section. If the inspections and tests are satisfactory, the raft shall be repacked together with its equipment in the container with the cylinder(s) charged and the raft in all respects ready for use. The container shall be shipped prepaid to the Field Testing and Development Center, Coast Guard Yard, Baltimore, Md., 21226, for testing in accordance with paragraphs (e)(1) through (12) of this section. The following additional material shall be forwarded at that time: Completely charged cylinder(s) (one or two depending on the number used in the raft design), 2 yards of all coated cloth used, and two seams 7 inches wide by 12 inches long made in exact accordance with the manufacturer's plans and specifications.

(1) *Seam strength.* It shall be demonstrated that the sample seams can withstand a test load equal to the coated cloth tensile strength.

(2) *Drop test.* The inflatable liferaft, complete with all its equipment shall be set for operation and dropped into water from a height of not less than 60 feet. The raft shall not be inflated until it has been demonstrated that the raft in its carrying case will remain afloat for not less than one-half hour. The operating lanyard shall then be pulled and the raft shall break free from its case and assume its designed shape with canopy erected and in all respects ready for boarding. The raft shall not sustain damage which

would be sufficient to prevent its use as emergency abandon-ship flotation equipment, nor shall the equipment suffer damage sufficient to affect its usefulness.

(3) *Loading, seating and swamp test.* The raft shall be loaded with the number of persons it is intended to carry. Each person used in this test shall be an adult wearing an approved life jacket and the average of the weight of all persons used in the test shall not be less than 165 pounds. It shall be demonstrated that the floor can be inflated, that there is sufficient head room, and that the occupants have adequate room and access to the equipment. The floor shall then be deflated and the raft flooded. In this condition the raft shall support the number of persons it is intended to carry and remain seaworthy.

(4) *Stability test.* The full complement of the raft shall be crowded to one side and then to one end and in each case the freeboard shall be adequate to prevent the raft being swamped. The floor shall be deflated for this test.

(5) *Damage test.* It shall be demonstrated that the buoyancy and stability required by § 160.051-4(h) can be obtained when the raft is in a condition simulating damage. The freeboard in damage condition shall be adequate to prevent the raft being swamped.

(6) *Righting test.* It shall be demonstrated that the liferaft is capable of being righted by one man if it inflates in an inverted position.

(7) *Boarding test.* It shall be demonstrated that the liferaft can be boarded from the water, within 30 seconds of the time the operating lanyard is pulled, by an adult suitably clothed and wearing an approved life jacket.

(8) *Towing test.* It shall be demonstrated that when a tow line is attached to the towing connection the loaded raft can be satisfactorily towed at a speed of five knots.

(9) *Jump test.* It shall be demonstrated that an adult, suitably clothed and wearing an approved life jacket, can jump on the canopy of the liferaft from a height of not less than 15 feet without damage to the canopy.

(10) *Mooring out test.* The raft shall be ballasted with weights equivalent to its capacity, (165 pounds per person) and moored out for 30 days. Topping up will be permitted each morning of the test if necessary. Upon completion of the test period the buoyancy compartments shall be tested in accordance with the over pressure test requirements of subparagraph (c)(2) of this section.

(11) *Temperature Exposure.* (i) *General.* The packed raft must be exposed in a test chamber to a temperature of —22° F, inflated and then repacked and exposed to a temperature of 150° F and inflated.

(ii) *Procedure.* (*a*) Thermocouples or similar instrumentation must be located at the inflation cylinders and at the center of the packed raft.

(*b*) The packed raft must remain exposed in the chamber until the test temperature has been reached.

(*c*) Inflation must take place in the test chamber. However, for elevated temperature test, raft may be removed from chamber if inflation begins within one minute of its removal.

(iii) *Results.* (*a*) The raft must achieve design shape with its canopy erect within three minutes after exposure to the low temperature.

(*b*) The raft fabric must not show signs of cracking, tackiness, or slipping seams and must be in all respects ready for use after exposure to both low and elevated temperature inflation tests.

(12) *Launching load test.* The following applies to a liferaft subject to the provisions of § 160.051-4(j) that is to operate in conjunction with a launching device approved in accordance with Coast Guard specification 160.063. It shall be demonstrated that the raft while suspended or loaded by its launching connection(s) can sustain a distributed deadweight load of 2.2 times its normal carrying capacity for a period of one-half hour. The normal carrying capacity shall be equivalent to the number of persons allowed (165 pounds per person) together with the weight of equipment carried, plus 10 percent of the total load including the weight of the raft. The distributed deadweight load on the raft together with the raft's attachment(s) and rig-

ging to a test fixture shall so interact as to simulate the loads and stresses that the raft will undergo when operated with an approved launching device.

[CGFR 59-26, 24 FR 5546, July 9, 1959, as amended by CGFR 65-9, 30 FR 11479, Sept. 8, 1965; CGD 73-160R, 39 FR 9669, Mar. 13, 1974]

§ 160.051-6 Servicing.

(a) *Frequency.* All inflatable liferafts shall be serviced every twelve months at approved servicing facilities.

(b) [Reserved]

(c) *Service manual.* Manufacturers of inflatable liferafts shall prepare service manuals which shall include instructions for opening, inspecting, testing, repairing and repacking each of their approved liferafts. Where extensive repairs are necessary the inflatable liferafts shall be returned to the manufacturer.

(1) *Instruction placard.* Each manufacturer of inflatable liferafts shall provide the appropriate number of instruction placards to the master or operator of the vessel on which his particular inflatable liferafts are carried. The instruction placard shall include simple instructions and illustrations showing the operations of launching and inflating the inflatable liferaft, which shall be submitted for approval to the Commandant with the other items required by § 160.051-9(a). In size, such placard shall not be greater than 14 inches by 20 inches.

(d) *Servicing facilities and personnel.* Servicing facilities shall be clean, free from excessive dust, drafts, and strong sunlight and arranged so that even temperatures can be maintained. The floor shall be smooth and kept clean and free from oil, grease, and abrasive materials. Equipment for performing the necessary tests and repairs shall be provided. After a raft manufacturer has indicated his choice of a servicing facility to the cognizant Officer in Charge, Marine Inspection, the servicing facility shall apply to the cognizant Officer in Charge, Marine Inspection, for an inspection of his facility. The Officer in Charge, Marine Inspection, shall determine the adequacy of equipment and spaces and competence of the personnel and shall submit a report of his findings to the Commandant. The Commandant will issue a letter to the manufacturer, with copies to the servicing facilities and to cognizant Officer in Charge, Marine Inspection, indicating which servicing facilities have been approved as a prerequisite to approval of the inflatable liferafts, and which must be maintained to keep the approval in effect. Thereafter, all material and personnel changes in a listed facility shall be subject to the approval of the cognizant Officer in Charge, Marine Inspection.

(1) *Servicing equipment.* The equipment provided at the plant shall be as recommended by the raft manufacturer and shall include the following:

(i) A complete set of plans for the inflatable liferafts to be serviced.

(ii) A current copy of the Coast Guard Specification 160.051.

(iii) A current copy of the manufacturer's service manual.

(iv) Hot presses (if applicable).

(v) Safety-type glue pots or equivalents.

(vi) Abrasive devices.

(vii) A source of air pressure.

(viii) Mercury or water manometer.

(ix) Thermometer.

(x) Barometer, aneroid or mercury.

(xi) Calibrated torque-wrench for assembling the inflation system.

(xii) Accurate weighing scale.

(xiii) A stock of repair materials, spare parts, and stowage accessories as specified by the manufacturer. Limited "shelf life" items need not be stocked if they can be procured readily from the manufacturer within a reasonable time, to the satisfaction of the cognizant Officer in Charge, Marine Inspection.

(xiv) A complete stock of the equipment required to be stowed in the inflatable liferafts, except that items of equipment which may be readily procured need not be stocked.

(2) *Trained personnel.* (i) The servicing facility shall be staffed by one or more persons who have successfully completed a factory training course in the servicing of approved inflatable liferafts and have documentary evidence thereof. Persons who can show proof of equivalent practical experi-

ence in this field will be acceptable in lieu of factory-trained personnel.

(ii) The cognizant Officer in Charge, Marine Inspection, shall maintain and provide a servicing facility with a list of its employees who qualify under paragraph (d)(2)(i) of this section to service the rafts. This list shall include the names of persons subsequently employed for the work since the issuance of the original servicing facility letter described in this paragraph.

(3) *Qualifying tests.* A marine inspector shall observe the servicing of at least one inflatable liferaft of the type and manufacture to be serviced after approval of the facility, from the time of unpacking until inspected, repaired and repacked. This raft shall satisfactorily pass the inflation test required by § 160.051-5(c)(4). In addition three rafts shall be packed in the presence of the marine inspector (or the same raft may be deflated and repacked three times) and then successfully inflation-tested to prove the correctness of the stowage. The latter three tests need not run beyond the three minutes specified for complete inflation.

(e) *Inspection.* The assignment of a marine inspector to witness the inspections and testing shall be scheduled with the Officer in Charge, Marine Inspection, at least 24 hours in advance. The marine inspector shall witness the servicing of each inflatable liferaft and conduct a working pressure leakage test as outlined in § 160.051-5(c)(3), except that the waiting period may be 2 hours in lieu of 6 hours. Each inflatable liferaft, subject to § 160.051-4(j), having a suspension system which is integral with the liferaft and is intended to be used in launching operations shall be proof tested by a suspension test of 1.1 times the normal carrying capacity as specified in § 160.051-5(e)(12). All equipment shall be inspected for condition and outdated water, signals, etc. shall be replaced. The cells for the lights required under § 160.051-7(b)(c) of this title shall be renewed when a raft undergoes its annual servicing. Damaged or faded instruction labels on the container of a raft shall be replaced at annual servicing. Inflation cylinders shall be weighed and recharged if the weight loss exceeds 5 percent of the weight of the charge. After the raft has been satisfactorily serviced and repacked, the container shall be sealed as required by § 160.051-4(f) and the metal inspection plate of the container described in § 160.051-8(a) will be stamped "Passed" together with the date, and the Marine Inspection Office identification letters. The following additional conditions apply:

(1) *Recording.* The servicing facility shall maintain a complete record of each inflatable liferaft serviced. This record shall be made available to the Officer in Charge, Marine Inspection, upon request. The record shall include the following:

(i) Serial number of the raft.

(ii) Date raft inspected and repacked.

(iii) Initials of witnessing marine inspector.

(iv) Identity of the ship receiving the raft.

(v) Date of issuance to the ship.

(2) *Servicing certificate.* A certificate shall be issued by the servicing facility for each inflatable liferaft inspected and serviced. It shall indicate the serial number of the raft, the date of inspection and the initials of the marine inspector. This certificate will be retained in the vessel's files as evidence of compliance with the annual inspection requirement. A copy of the servicing certificate shall be furnished to the marine inspector.

(f) *Special fifth-year inspection tests.* In addition to the above annual inspection requirements, an inflatable liferaft shall undergo the following special tests at 5-year intervals after its date of manufacture:

(1) *Inflation cylinders.* The inflation cylinders shall be retested and marked in accordance with the regulations of the Department of Transportation as noted in § 147.04-1 of Subchapter N (Dangerous Cargoes) of this chapter.

(2) *Gas inflation.* An inflatable liferaft, at 5-year intervals after its date of manufacture, on its arrival at a servicing facility, shall be removed from its container and, while still folded, shall be inflated by the operation of its gas cylinder(s) in the presence of a marine inspector. Rafts showing minor leaks from this infla-

tion can be repaired at the servicing facility, but any rafts that are ten (10) or more years past their dates of manufacture that leak extensively or show fabric damage from this inflation shall be retired from service and their nameplates showing Coast Guard approval shall be removed by the marine inspector. Rafts that satisfactorily pass the above gas inflation test shall then undergo the usual annual servicing described above. A raft that satisfactorily passes the gas inflation test shall have the date and the port at which it was performed stamped on the container inspection plate described under § 160.051-8(a).

(3) *Inflation cylinder valves and seals.* After a raft has completed the tests of paragraph (f) (1) or (2) of this section, the poppet pin assembly, including its seals, O-rings and gaskets made of rubber, shall be renewed on the inflation heads of the gas cylinders by the activity approved to perform the hydraulic testing outlined in paragraph (f)(1) of this section. An inflation cylinder that has been recharged shall stand for at least 2 weeks and be checked for leakage by weighing before being returned to service.

(46 U.S.C. 375, 416; 49 U.S.C. 1655(b); 49 CFR 1.4(b), and 1.46)

[CGFR 59-26, 24 FR 5547, July 9, 1959, as amended by CGFR 61-15, 26 FR 9300, Sept. 30, 1961; CGFR 65-9, 30 FR 11479, Sept. 8, 1965; CGD 72-133R, 37 FR 17041, Aug. 24, 1972; CGD 72-133, 38 FR 5338, Feb. 28, 1973; CGD 75-186, 41 FR 10437, Mar. 11, 1976]

§ 160.051-7 Equipment.

(a) *General.* All inflatable liferafts, regardless of the service, shall be provided with the equipment required by paragraph (b) of this section. In addition, liferafts intended for ocean service vessels shall be provided with the equipment set forth in paragraph (c) of this section and those intended for limited service vessels shall be provided with equipment set forth in paragraph (d) of this section.

(b) *Items required for all rafts.* The following equipment for ocean service and limited service liferafts shall be stowed outside of the equipment containers so as to be readily available:

(1) *Boarding ladder.* A boarding ladder or equivalent at each entrance to the raft. In addition, hand holds or equivalent on each side of each entrance to assist in boarding.

(2) *Heaving line.* A buoyant heaving line not less than 100 feet in length and having a breaking strength of not less than 250 pounds fitted with a buoyant quoit at one end with the other end attached to the raft near the after entrance.

(3) *Instruction manual.* An instruction manual, printed on water-resistant film or plastic coated paper and suspended in a clear film envelope from one of the canopy arch tubes, shall describe the raft and its equipment, including the use of the inflation pump, repair kit, sea anchor, etc. This manual shall also contain all of the survival information recommended in Inter-Governmental Maritime Consultative Organization Resolution 181, dated October 29, 1969, as amended, together with the illustrated table of lifesaving signals from CG-811 (Rev.). The plastic Instruction Card described under § 160.051-7(b)(13) can be contatined in the same envelope with the instruction manual if arrangements are made for the card to be visible from either face of the envelope.

(4) *Jackknife.* A jackknife of an approved type constructed in accordance with Subpart 160.043 of Subchapter Q (Specifications) of this chapter, shall be fitted in a pocket near the forward entrance.

(5) *Lights.*

(i) The canopy required in § 160.051-4(c) must have a light attached to the—

(*a*) Top; and

(*b*) Inside.

(ii) The lights required in paragraph (b)(5)(i) of this section must—

(*a*) Operate automatically when the raft is inflated;

(*b*) Be capable of 12 months service;

(*c*) Be watertight; and

(*d*) Be powered by wateractivated or dry cells that are—

(*1*) Capable of operating the light for 12 hours after being stored for a period of time up to 24 months; and

(*2*) Renewed when the raft undergoes annual servicing.

(iii) The light required in paragraph (b)(5)(i)(*a*) of this section must be—

(*a*) Installed with a power source that operates the light for 12 hours; and

(*b*) Capable of being seen from a distance of 2 miles or be one of the light types listed in Table 1 of this section.

(iv) The light required in paragraph (5)(i)(*b*) must be provided with a separate power source that—

(*a*) Operates the light for 12 hours: and

(*b*) Has a means of interrupting the current to the lights.

(6) *Lifelines.* Two lifelines of not less than 9/16 inch nylon tubular webbing, or equivalent, shall be fitted: one around the outside periphery and the other around the inside of the raft. The outside lifeline shall be festooned in bights, not more than 24 inches long and fastened at intervals not exceeding 18 inches, which shall hang within 3 inches of the waterline when the raft is fully loaded.

TABLE 1

Light type	Light output (minimum) [1]	Flash frequency cycles/min	
		Minimum	Maximum
Steady incandescent	5.0 candela	0	0
Flashing incandescent	5.0 effective candela.	50	70
Flashing stroboscopic	0.5 candela-second flash.	50	70

[1] The minimum light output shall be maintained in all directions of the upper hemisphere.

(7) *Paddles.* Two paddles, 4 feet long.

(8) A painter shall be provided for launching and holding the raft during boarding. It shall be of nylon line, or equivalent, or a type easily gripped, 100 feet in length, and stowed so that it will run free when the raft is launched and not cause inadvertent inflation before the raft is in the sea. The nominal breaking strength of the painter when unknotted, including attachments, shall be 3,000 pounds for rafts approved for capacities of 10 or more persons, and 1,500 pounds for rafts approved for capacities of less than 10 persons. The end of the painter protruding from the container of the raft shall be resistant to the deleterious effects of sunlight. A "float free" link made of stainless steel rod with a nominal breaking strength, including attachments of 500 pounds shall connect the end of the painter to the vessel. In addition, a separate steel cleat with horns not less than 3 inches in length shall be installed adjacent to the cradle for belaying the end or each raft's painter to the ship when manually launching. The launching instructions on the container shall include the following: (i) "When stowing the raft, connect the steel link to the vessel" and (ii) "Before launching the raft by hand, pull out the line from the container and make it fast to the cleat provided." Existing rafts previously approved under this specification shall be altered to comply with the above when the rafts are next serviced.

(9) *Pump, inflation-deflation.* An inflation-deflation pump with hose in accordance with Military Specification MIL–L–19496, or equivalent.

(10) *Righting gear.* Suitable hand holds or straps on the underside of the floor to enable a righting moment to be exerted. Such straps shall be a web material of adequate strength. The righting strap shall run the full width of the liferaft and shall be secured to the buoyancy chamber on both sides of the raft.

(11) *Sea anchor.* Two sea anchors in accordance with Military Specifications, MIL–L–19496 or equivalent, each fitted with 50 feet of ¼-inch diameter braided nylon line or equivalent; one anchor to be stowed inside the raft and ready for use and the other stowed outside the raft which will stream automatically without entanglement when the raft is inflated.

(12) *Towing connection.* A suitable towing connection at each end of the raft.

(13) *Instruction card.* A plastic card suspended from the inside canopy showing the immediate steps to be taken by survivors on entering a raft as recommended by Intergovernmental Maritime Consultative Organization Resolution 181, dated October 29, 1969. This card shall also explain the noise that can be expected to accompany the operation of any CO_2 relief valves that may be installed.

(c) *Ocean service equipment.* Equipment for liferafts intended for ocean service shall be stowed in watertight containers which are tied to the inside of the raft with short lengths of nylon line webbing, or equivalent. The contents of each watertight equipment container shall be listed on a plastic card attached to the container's opening. The following ocean service equipment shall be provided:

(1) *Bailer(s).* Bailer(s) shall be of flexible material not less than 6 inches in diameter, one of which shall be provided on rafts accommodating 12 persons or less, and two on rafts accommodating 13 persons or more.

(2) *Drinking cup.* A flexible plastic drinking cup graduated in ounces.

(3) *First-aid kit.* An approved first-aid kit in accordance with Subpart 160.054 of this Subchapter Q (Specifications).

(4) *Flashlight.* An approved size No. 3 flashlight constructed in accordance with Subpart 161.008 of this chapter. Three spare cells (or one 3-cell battery) and two spare bulbs in a waterproof container shall be provided with each flashlight. Batteries shall be replaced at each servicing of the liferaft.

(5) *Mirror, signaling.* One signaling mirror of an approved type.

(6) *Provisions.* One pound of hard bread or its approved equivalent for each person. Provisions to be packaged in hermetically sealed cans of an approved type.

(7) *Repair kit.* A repair kit consisting of six sealing clamps in accordance with Military Specification MIL-L-19496; five 2-inch diameter tube patches and cement compatible with the raft fabric together with a roughing tool. Repair kit cement shall be replaced when a raft undergoes its annual servicing. A tube of cement shall show by a date of manufacture on its exterior, or by an accompanying affidavit, that it has been manufactured within 18 months of the time that the cement is packed in a raft.

(8) *Signals.* Two hand-held rocket-propelled parachute red flare distress signals constructed in accordance with Subpart 160.036 of this Subchapter Q (Specifications), and six hand red flare distress signals constructed in accordance with Subpart 160.021 or Subpart 160.023 of this Subchapter Q (Specifications). All overage signals are to be replaced when a raft undergoes its annual servicing. A signal previously in service in a raft can be packed if its allowed 3-year period of service has not expired.

(9) *Sponge, cellulose.* Two Type 1, Size 10 cellulose sponges.

(10) *Water.* One and one-half quarts of drinking water per person in approved hermetically sealed containers constructed and filled in accordance with Subpart 160.026 of this Subchapter Q (Specifications). Service life of this equipment shall be limited to 5 years from date of packing. One pint of this requirement per person may be replaced by desalting kit(s) approved in accordance with Subpart 160.058 of this Subchapter Q (Specifications), that shall be capable of producing an equal amount of fresh water. A container of drinking water with a date of manufacture showing that its allowed 5-year period of service has not expired can be packed in a raft.

(11) *Jackknife.* On rafts accommodating 13 persons or more, an approved jackknife shall be provided in addition to that required by paragraph (b)(4) of this section.

(12) *Signal whistle.* One signal whistle of the ball type, made of corrosion-resistant construction, with a 36-inch lanyard attached, and in good working order.

(13) *Can openers.* Three means of opening hermetically sealed containers shall be provided. Special blade(s) on the approved jackknives are accepted in this accounting in addition to any can opener(s) the blades or cutting edges of which shall be sheathed to prevent damage to the raft and its equipment.

(14) *Fishing tackle.* One emergency fishing tackle kit in accordance with Subpart 160.061 of this Subchapter Q (Specifications).

(15) *Antiseasickness tablets.* Six antiseasickness medicinal tablets for each person the raft is rated to carry.

(d) *Limited service equipment.* Equipment for liferafts intended for limited service shall be stowed in water-tight containers which are tied to the inside of the raft with short lengths of nylon line, webbing or equivalent. The contents of each water-tight equipment container shall be listed on a plastic card attached to the container's opening. The following limited service equipment shall be provided:

(1) *Bailer.* One flexible plastic bailer not less than 6 inches in diameter.

(2) *Flashlight.* An approved type I, size 3 flashlight constructed in accordance with Subpart 161.008 of this Subchapter Q (Specifications). Three spare cells (or one 3-cell battery) and two spare bulbs in a waterproof container shall be provided with each flashlight. Batteries shall be replaced at each servicing of the liferaft.

(3) *Repair kit.* A repair kit consisting of six sealing clamps in accordance with Military Specification MIL-L-19496, five 2-inch diameter tube patches and cement compatible with the raft fabric together with a roughing tool. Repair kit cement shall be replaced when a raft undergoes its annual servicing. A tube of cement shall show by a date of manufacture on its exterior, or by an accompanying affidavit, that it has been manufactured within 18 months of the time that the cement is packed in a raft.

(4) *Signals.* One hand-held rocket-propelled parachute red flare distress signal constructed in accordance with Subpart 160.036 of this Subchapter Q (Specifications), and two hand red flare distress signals or two hand combination flare and smoke distress signals constructed in accordance with Subpart 160.021 or Subpart 160.023 of this Subchapter Q (Specifications). All overage signals are to be replaced when a raft undergoes its annual servicing. A signal previously in service can be packed in a raft if its allowed 3-year period of service has not expired.

(5) *Sponge, cellulose.* One type 1, Size 10 cellulose sponge.

[CGFR 59-26, 24 FR 5547, July 9, 1959, as amended by CGFR 65-9, 30 FR 11480, Sept. 8, 1965; CGFR 70-143, 35 FR 19965, Dec. 30, 1970; CGD 72-133R, 37 FR 17041, Aug. 24, 1972, CGD 72-133, 38 FR 5338, Feb. 28, 1973; CGD 73-201R, 38 FR 31297, Nov. 13, 1973]

§ 160.051-8 Nameplate and marking.

(a) *Nameplate.* Each inflatable liferaft and container shall have permanently attached a substantial nameplate of compatible material on which is embossed or imprinted the name of the manufacturer, the approval number, the manufacturer's model number and serial number, the number of persons for which the inflatable liferaft is approved, and the lot number. In addition, the container shall be marked "Ocean Service Equipment" or "Limited Service Equipment" as applicable, together with the Marine Inspection Office identification letters, the date, and the letters "USCG". A raft container shall also be provided with a stainless steel plate of 0.032-inch minimum thickness of sufficient size for showing a stampel record of the data of the annual inspections and the gas inflation tests described respectively in §§ 160.051-6(e) and 160.051-6(f)(2).

(b) *Marking.* Marking shall be clearly and legibly applied in a color contrasting to its background, using materials which are permanent for the life of the inflatable liferaft as follows: Instructions for inflating; directions for righting if the raft inflates in an inverted position; directions for boarding; position and use of items stowed outside the equipment containers; contents of equipment containers, and warning against tampering.

(46 U.S.C. 375, 416, 481; 49 U.S.C. 1655(b); 49 CFR 1.4(b), and 1.46)

[CGFR 59-26, 24 FR 5548, July 9, 1959, as amended by CGFR 65-64, 31 FR 562, Jan. 18, 1966; CGD 75-186, 41 FR 10437, Mar. 11, 1976]

§ 160.051-9 Procedure for approval.

(a) *Preliminary plans and specifications.* Inflatable liferafts for use on vessels subject to Coast Guard inspection are approved only by the Commandant, U.S. Coast Guard, Washington, D.C. 20593. Before any action is taken on any design arrangement and construction of the inflatable liferaft, material specifications, and a description of construction methods with a list of servicing facilities and their qualified employees, must be submitted to the Commandant through the Coast Guard District in which the inflatable liferafts are built.

(b) *Pre-approval inspections and tests.* If the drawings and specifications are satisfactory, the Commander of the Coast Guard District in which the inflatable liferaft is to be built shall be notified in writing when fabrication is to commence. A marine inspector will be assigned to observe the construction in accordance with the plans and specifications, and upon completion will witness the tests described by § 160.051-5(c)(1) through (4). The raft shall then be forwarded to the Field Testing and Development Center, Coast Guard Yard, Curtis Bay, Baltimore, Md. 21226, for testing in accordance with § 160.051-5(e)(1) through (12). The commandant will bill the manufacturer for the costs of the tests performed.

(c) *Final plans and specifications.* After the tests have been successfully completed, the manufacturer shall present to the inspector four copies of the plans and specifications including any corrections, changes or additions which may have been found necessary since the original submittal.

(d) *Commandant's approval action.* Upon receipt of the inspector's report of the examinations and tests conducted at the manufacturer's plant, four copies of corrected drawings and specifications, and a report of the pre-approval tests conducted at the Coast Guard Yard, the Commandant will determine compliance of the inflatable liferaft with the requirements of this subpart and its suitability for type or brand approval for use on inspected vessels. Suitable documentary evidence of compliance with the requirements of § 160.051-6 will be required before approvals are issued.

[CGFR 59-26, 24 FR 5548, July 9, 1959, as amended by CGFR 65-64, 31 FR 562, Jan. 18, 1966; CGFR 66-33, 31 FR 15297, Dec. 6, 1966; CGD 72-133R, 37 FR 17042, Aug. 24, 1972]

Subpart 160.052—Specification for a Buoyant Vest, Unicellular Plastic Foam, Adult and Child

AUTHORITY: Secs. 6 and 17, 54 Stat. 164, as amended, 166, as amended, 46 U.S.C. 526e, 526p. Treasury Department Order 120, July 31, 1950, 15 FR 6521.

SOURCE: CGFR 65-37, 30 FR 11588, Sept. 10, 1965, unless otherwise noted.

§ 160.052-1 Incorporation by reference.

(a) *Specifications and Standards.* This subpart makes reference to the following documents.

(1) [Reserved]

(2) Military specification:

MIL-W-530F—Webbing, Textile, Cotton, General Purpose, Natural and in Colors.

(3) Federal Standards:

No. 191—Textile Test Methods.
No. 751A—Stitches, Seams, and Stitching.

(4) Coast Guard specifications:

160.055—Life Preservers, Unicellular Plastic Foam, Adult and Child.
164.015—Plastic Foam, Unicellular, Buoyant Sheet and Molded Shapes.

(b) *Plans.* The following plans, of the issue in effect on the date buoyant vests are manufactured, form a part of this subpart:

Dwg. No. 160.052-1:
Sheet 1—Cutting Pattern and General Arrangement, Model AP.
Sheet 2—Cutting Pattern and General Arrangement, Model CPM.
Sheet 3—Cutting Pattern and General Arrangement, Model CPS.
Sheet 4—Insert Patterns.

(c) *Copies on file.* The manufacturer shall keep a copy of each specification and plan required by this section on file together with the certificate of approval. Plans and specifications may be obtained as follows:

(1) The Coast Guard plans and specifications may be obtained upon request from the Coast Guard (MMT), Room 8301, 400 Seventh Street SW., Washington, DC 20590, or a recognized laboratory listed in § 160.052-8b.

(2) The Federal Specifications and Standards may be purchased from the Business Service Center, General Services Administration, Washington, D.C. 20407.

(3) The military specification may be obtained from the Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, PA 19120.

[CGFR 65-37, 30 FR 11588, Sept. 10, 1965, as amended by CGD 72-90R, 37 FR 10837, May 31, 1972; CGD 72-163R, 38 FR 8120, Mar. 28, 1973; CGD 78-012, 43 FR 27153, 27154, June 22, 1978]

§ 160.052-2 Size and model.

(a) A standard buoyant vest is manufactured in accordance with a plan specified in § 160.052-1(b) and is a:

(1) Model AP, adult (for persons over 90 pounds);

(2) Model CPM, child, medium (for persons weighing from 50 to 90 pounds); or

(3) Model CPS, child, small (for persons weighing less than 50 pounds).

(b) A nonstandard buoyant vest is:

(1) Manufactured in accordance with the manufacturer's approved plan;

(2) Equivalent in performance to the standard buoyant vest; and

(3) Assigned a model designation by the manufacturer for the following sizes:

(i) Adult (for persons weighing over 90 pounds);

(ii) Child, medium (for persons weighing from 50 to 90 pounds);

(iii) Child, small (for persons weighing less than 50 pounds).

[CGD 72-163R, 38 FR 8120, Mar. 28, 1973]

§ 160.052-3 Materials—Standard vests.

(a) *General.* All materials used in the construction of buoyant vests shall be obtained from a supplier who furnishes an affidavit certifying that the material meets the requirements of the applicable reference specifications. The requirements for materials specified in this section are minimum requirements, and consideration will be given to the use of alternate materials in lieu of those specified. Detailed technical data and samples of all proposed alternate materials shall be submitted for approval prior to being incorporated in the finished product.

(b) *Unicellular plastic foam.* The unicellular plastic foam shall be all new material complying with the requirements of specification Subpart 164.015 of this subchapter for Type A or B foam.

(c) *Envelope.* The buoyant vest envelope, or cover, shall be made from 39″, 2.85 cotton jeans cloth, with a thread count of approximately 96 x 64. The finished goods shall weigh not less than 4.2 ounces per square yard, shall have thread count of not less than 94 x 60, and shall have a breaking strength of not less than 85 pounds in the warp and 50 pounds in the filling. Other cotton fabrics having a weight and breaking strength not less than the above will be acceptable. There are no restrictions as to color, but the fastness of the color to laundering, water, crocking, and light shall be rated "good" when tested in accordance with Federal Test Method Standard No. 191, Methods 5610, 5630, 5650, and 5660.

(d) *Tie tapes and body strap loops.* The tie tapes and body strap loops for both adult and child sizes must be ¾-inch cotton webbing meeting the requirements of military specification MIL-T-43566 (Class I) for Type I webbing.

(d-1) *Body straps.* The complete body strap assembly, including hardware, must have a minimum breaking strength of 150 pounds for an adult size and 115 pounds for a child size. The specifications for the webbing are as follows:

(1) For an adult size vest, the webbing must be 1 inch;

(2) For a child size vest, the webbing must be three-quarter inch and meet the requirements of military specification MIL-W-530 for Type IIa webbing.

(e) [Reserved]

(f) *Thread.* Each thread must meet the requirements for the specified type, class, and size of a Federal Specification listed in Table 160.001-2(j). Each cotton thread must be treated with a mildew inhibitor that is accepted by the Commandant (G-MMT-3). Only one kind of thread may be used in each seam.

[CGFR 65-37, 30 FR 11588, Sept. 10, 1965, as amended by CGD 72-90R, 37 FR 10837, May 31, 1972; CGD 72-163R, 38 FR 8120, Mar. 28, 1973; CGD 73-130R, 39 FR 20684, June 13, 1974; CGD 78-012, 43 FR 27154, June 22, 1978]

§ 160.052-3a Materials—Dee ring and snap hook assemblies and other instruments of closure for buoyant vests.

(a) *Specifications.* Dee ring and snap hook assemblies and other instruments of closure for buoyant vests may have decorative platings in any thickness and must meet the following specifications:

(1) The device must be constructed of inherently corrosion resistant materials. As used in this section the term "inherently corrosion resistant materials" includes, but is not limited to brass, bronze, and stainless steel.

(2) The size of the opening of the device must be consistent with the webbing which will pass through the opening.

(b) *Testing requirements.* Dee ring and snap hook assemblies and other instruments of closure for buoyant vests must—

(1) Be tested for weathering. The Coast Guard will determine which one or more of the following tests will be used:

(i) Application of a 20 percent sodium-chloride solution spray at a temperature of 95° F (35° C) for a period of 240 hours in accordance with the procedures contained in method 811 of the Federal Test Method Standard No. 151.

(ii) Exposure to a carbon-arc weatherometer for a period of 100 hours.

(iii) Submergence for a period of 100 hours in each of the following:

(*a*) Leaded gasoline.

(*b*) Gum turpentine.

(iv) Exposure to a temperature of 0°±5°F (17.6±2.775° C) for 24 hours; and

(2) Within 5 minutes of completion of the weathering test required by paragraph (b)(1) of this section, the assembly must be attached to a support and bear 150 pounds for an adult size and 115 pounds for a child size for 10 minutes at ambient temperatures without breaking or distorting.

[CGD 73-130R, 39 FR 20684, June 13, 1974]

§ 160.052-4 Materials—nonstandard vests.

(a) *General.* All materials used in nonstandard buoyant vests must be equivalent to those specified in § 160.052-3 and be obtained from a supplier who furnishes an affidavit in accordance with the requirement in § 160.052-3(a).

(b) *Cover.* A vinyl-dip coating may be allowed for the covering of the vest instead of a fabric envelope if the coating meets the requirements in § 160.055-5(b)(2) of this chapter except there is no color restriction.

(c) *Reinforcing tape.* When used, the reinforcing tape around the neck shall be ¾" cotton tape weighing not less than 0.18 ounces per linear yard having a minimum breaking strength of not less than 120 pounds.

[CGFR 65-37, 30 FR 11588, Sept. 10, 1965, as amended by CGD 72-90R, 37 FR 10837, May 31, 1972; 37 FR 11774, June 14, 1972, CGD 72-163R, 38 FR 8120, Mar. 28, 1973]

§ 160.052-5 Construction—standard vests.

(a) *General.* This specification covers buoyant vests which essentially consist of a fabric envelope in which are enclosed inserts of buoyant material arranged and distributed so as to provide the flotation characteristics and buoyancy required to hold the wearer in an upright or slightly backward position with head and face out of water. The buoyant vests are also fitted with straps and hardware to provide for proper adjustment and close and comfortable fit to the bodies of various size wearers.

(b) *Envelope.* The envelope or cover shall be made of three pieces. Two pieces of fabric shall be cut to the pattern shown on Dwg. No. 160.052-1, Sheet 1 for adult size, and Sheets 2 and 3 for child sizes, and joined together with a third piece which forms a 2" finished gusset strip all around. Reinforcing strips of the same material as the envelope shall be stitched to the inside of the front piece of the envelope in way of the strap attachments as shown by the drawings.

(c) *Buoyant inserts.* The unicellular plastic foam buoyant inserts shall be cut and formed as shown on Dwg. 160.052-1, Sheet 4.

(d) *Tie tapes, body straps, and hardware.* The tie tapes, body straps, and hardware shall be arranged as shown on the drawings and attached to the envelope with the seams and stitching indicated.

(e) *Stitching.* All stitching shall be short lock stitch conforming to Stitch Type 301 of Federal Standard No. 751, and there shall be not less than 7 nor more than 9 stitches to the inch.

(f) *Workmanship.* Buoyant vests shall be of first-class workmanship and shall be free from any defects materially affecting their appearance or service-ability.

[CGFR 65-37, 30 FR 11588, Sept. 10, 1965, as amended by CGD, 72-163R, 38 FR 8120, Mar. 28, 1973]

§ 160.052-6 Construction—nonstandard vests.

(a) *General.* The construction methods used for nonstandard buoyant vests must be equivalent to those requirements in § 160.052-5 for a standard vest and also meet the requirements in this section.

(b) *Size.* Each nonstandard vest must contain the following volume of plastic foam buoyant material, determined by the displacement method:

(1) Five hundred cubic inches or more for an adult size;

(2) Three hundred and fifty cubic inches or more for a child, medium size;

(3) Two hundred and twenty-five cubic inches or more for a child, small size.

(c) *Arrangement of buoyant material.* The buoyant material in a nonstandard vest must:

(1) Be arranged to hold the wearer in an upright or backward position with head and face out of water;

(2) Have no tendency to turn a wearer face downward in the water; and

(3) Be arranged so that 70 to 75 percent of the total is located in the front of the vest.

(d) *Neck opening.* Each cloth-covered nonstandard vest must have at the neck opening:

(1) A gusset; or

(2) Reinforcing tape.

(e) *Adjustment, fit, and donning.* Each nonstandard vest must be made with adjustments to:

(1) Fit a range of wearers for the type designed; and

(2) Facilitate donning time for an uninitiated person.

[CGD 72-163R, 38 FR 8120, Mar. 28, 1973]

§ 160.052-7 Inspections and tests—standard and nonstandard vests.[1]

(a) *General.* Manufacturers of listed and labeled buoyant vests shall—

(1) Maintain quality control of the materials used, the manufacturing methods and workmanship, and the finished product to meet the requirements of this subpart by conducting sufficient inspections and tests of representative samples and components produced;

(2) Make available to the recognized laboratory inspector and the Coast Guard inspector, upon request, records of tests conducted by the manufacturer and records of materials used during production of the device, including affidavits by supplier; and

(3) Permit any examination, inspection, and test required by the recognized laboratory or the Coast Guard for a produced listed and labeled device, either at the place of manufacture or some other location.

(b) *Lot size and sampling.* (1) A lot consists of 500 buoyant vests or fewer.

(2) A new lot begins after any change or modification in materials used or manufacturing methods employed.

(3) The manufacturer of the buoyant vests shall notify the recognized laboratory when a lot is ready for inspection.

(4) The manufacturer shall select samples in accordance with the requirements in Table 160.052-7(b)(4) from each lot of buoyant vests to be tested for buoyancy in accordance with paragraph (e) of this section.

TABLE 160.052-7(b)(4)—SAMPLE FOR BUOYANT VESTS

Lot size	*Number of vests in sample*
100 and under	1
101 to 200	2
201 to 300	3
301 to 500	4

(5) The manufacturer shall test—

(i) At least one vest from each lot for buoyancy in accordance with procedures contained in paragraph (e) of this section; and

---

[1] The manufacturer of a personal flotation device must meet 33 CFR 181.701 through 33 CFR 181.705 which require an instruction pamphlet for each device that is sold or offered for sale for use on recreational boats.

(ii) At least one vest in each 10 lots for strength of the body strap assembly in accordance with the procedures contained in paragraph (f) of this section.

(6) If a vest fails the buoyancy test, the sample from the next succeeding lot must consist of 10 specimen vests or more to be tested for buoyancy in accordance with paragraph (e) of this section.

(7) The manufacturer shall keep on file and make available to the laboratory inspector and Coast Guard inspector the records of inspections and tests, together with affidavits concerning the material.

(c) *Additional compliance tests.* An inspector from the recognized laboratory or Coast Guard may conduct an examination, test and inspection of a buoyant device that is obtained from the manufacturer or through commercial channels to determine the suitability of the device for listing and labeling or to determine its conformance to applicable requirements.

(d) *Test facilities.* The manufacturer shall admit the laboratory inspector and the Coast Guard inspector to any part of the premises at the place of manufacture of a listed and labeled device to—

(1) Examine, inspect, or test a sample of a part or a material that is included in the construction of the device; and

(2) Conduct any necessary examination, inspection, or test in a suitable place and with appropriate apparatus provided by the manufacturer.

(e) *Buoyancy*—(1) *Buoyancy test method.* Remove the buoyant inserts from the vests. Securely attach the spring scale in a position directly over the test tank. Suspend the weighted wire basket from the scale in such a manner that the basket can be weighed while it is completely under water. In order to measure the actual buoyancy provided by the inserts, the underwater weight of the empty basket should exceed the buoyancy of the inserts. To obtan the buoyancy of the inserts, proceed as follows:

(i) Weigh the empty wire basket under water.

(ii) Place the inserts inside the basket and submerge it so that the top of the basket is at least 2 inches below the surface of the water. Allow the inserts to remain submerged for 24 hours. The tank shall be locked or sealed during this 24-hour submergence period. It is important that after the inserts have once been submerged they shall remain submerged for the duration of the test, and at no time during the course of the test shall they be removed from the tank or otherwise exposed to air.

(iii) After the 24-hour submergence period, unlock or unseal the tank and weigh the wire basket with the inserts inside while both are still under water.

(iv) The buoyancy is computed as paragraph (e)(1)(i) of this section minus paragraph (e)(i)(iii) of this section.

(2) *Buoyancy required.* The buoyant inserts from adult size buoyant vests shall provide not less than 15½ pounds buoyancy in fresh water; the inserts from child medium size vests shall provide not less than 11 pounds buoyancy; and the inserts from child small size vests shall provide not less than 7 pounds buoyancy.

(f) *Body strap test.* The complete body strap assembly including hardware, shall be tested for strength by attaching the dee ring to a suitable support such that the assembly hangs vertically its full length. A weight as specified in § 160.052-3(d) shall be attached to the other end of the snap hook for 10 minutes. The specified weight shall not break or excessively distort the body strap assembly.

(g) *Additional approval tests for nonstandard vests.* Tests in addition to those required by this section may be conducted by the inspector for nonstandard vests to determine performance equivalence to a standard vest. Such additional tests may include determining performance in water, suitability of materials, donning time, ease of adjustment, and similar equivalency tests. Costs of any additional tests must be assumed by the manufacturer.

[CGFR 65-37, 30 FR 11588, Sept. 10, 1965, as amended by CGD 72-90R, 37 FR 10837, May 31, 1972; CGD 72-163R, 38 FR 8120, Mar. 28, 1973; CGD 75-008, 43 FR 9772, Mar. 9, 1978]

§ 160.052-8 Marking.

(a) Each buoyant vest must have the following information clearly marked in waterproof lettering that can be read at a distance of 2 feet:

Type II—Personal flotation device.
Inspected and tested in accordance with U.S. Coast Guard regulations.
(Name of buoyant material) provides a minimum buoyant force of (15½ lb., 11 lb., or 7 lb.).
Dry out thoroughly when wet.
Approved for use on all recreational boats and on uninspected commercial vessels less than 40 feet in length not carrying passengers for hire by persons weighing (over 90 lb., 50 to 90 lb., or less than 50 lb.).
U.S. Coast Guard Approval No. 160.050/(assigned manufacturer's No.)/(Revision No.); (Model No.).
(Name and address of manufacturer or distributor).
(Lot No.)

(b) *Waterproof marking.* Marking for buoyant vests shall be sufficiently waterproof so that after 72 hours submergence in water it will withstand vigorous rubbing by hand while wet without the printed matter becoming illegible.

[CGD 72-163R, 38 FR 8120, Mar. 28, 1973, as amended by CGD 75-008, 43 FR 9771, Mar. 9, 1978]

§ 160.052-8a Recognized laboratory.

To be designated a recognized laboratory, the laboratory must be—

(a) Operated as a nonprofit public service;

(b) Engaged regularly in the examination, testing and evaluation of the safety of materials, installations, and devices for marine use; and

(c) Established in factory inspection; listing and labeling by having an existing program and standards for evaluation, listing and labeling buoyant vests that are acceptable to the Commandant.

[CGD 72-90R, 37 FR 10838, May 31, 1972]

§ 160.052-8b Designated recognized laboratory.

Underwriters' Laboratories, Inc., Marine Department, Tampa East Industrial Park, 2602 Tampa East Boulevard, Tampa, Florida 33619 is a recognized laboratory.

[CGD 72-90R, 37 FR 10838, May 31, 1972]

§ 160.052-8c Compliance label.

If a recognized laboratory approves a buoyant vest, the device is allowed to carry the compliance label of the recognized laboratory.

[CGD 72-90R, 37 FR 10838, May 31, 1972]

§ 160.052-9 Procedure for listing and labeling.

(a) A recognized laboratory must inform each manufacturer that requests listing and labeling of a buoyant vest for use on a boat not carrying passengers for hire, of the procedures for—

(1) Inspection;

(2) Examination;

(3) Tests; and

(4) The forwarding to the Coast Guard of the test report and the description of the quality control program of the requesting manufacturer.

(b) The cost of any examination, test, and inspection, and the cost of listing and labeling must—

(1) Be paid by the manufacturer; and

(2) Be the same for similar services for each manufacturer.

(c) The Coast Guard reviews each test report and quality control procedures forwarded by the recognized laboratory, to determine if the approval requirements have been met. After the review is completed, the Coast Guard—

(1) Notifies the laboratory that the device is approved or disapproved and if approved, listed and labeled;

(2) Publishes notice of the approval in the FEDERAL REGISTER and Coast Guard publication CG-190.

(d) The Commandant, U.S. Coast Guard, determines all matters concerning approval requirements. The manufacturer or recognized laboratory may at any time request advice from the Commandant regarding these requirements.

[CGD 72-90R, 37 FR 10838, May 31, 1972, as amended by CGD 72-163R, 38 FR 8120, Mar. 28, 1973]

§ 160.052-11 Termination of listing and labeling.

(a) The listing and labeling as a Coast Guard approved buoyant vest may be terminated, withdrawn, canceled, or suspended by—

(1) Written notice to the recognized laboratory from the Commandant; or

(2) Written notice to the manufacturer from the recognized laboratory or the Commandant.

(b) The listing and labeling as a Coast Guard approved buoyant vest may be terminated if—

(1) The manufacturer does not want to retain the service;

(2) The listed device is no longer manufactured;

(3) The manufacturer's program does not provide continued assurance of the quality of the listed and labeled device.

(4) The device no longer conforms to current applicable requirements of the Coast Guard and the recognized laboratory; or

(5) The Coast Guard determines from the use of the device by the public or through other information that it is incapable of performing as a lifesaving device under the requirements of this subpart.

[CGD 72-90R, 37 FR 10838, May 31, 1972]

§ 160.052-12 Penalties.

(a) A manufacturer that violates any of approval requirements for listing and labeling but continues to mark the device as being U.S. Coast Guard approved is subject to the penalties contained in 14 U.S.C. 639.

[CGD 72-90R, 37 FR 10838, May 31, 1972]

Subpart 160.053—Work Vests, Unicellular Plastic Foam

AUTHORITY: R.S. 4417, as amended, 4417a, as amended, 4418, as amended, 4426, as amended, 4453, as amended, 4488, as amended, 4491, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, sec. 17, 54 Stat. 166, as amended, sec. 3, 54 Stat. 347, sec. 3, 70 Stat. 152, sec. 4, 67 Stat. 462, sec. 3, 68 Stat. 675; 46 U.S.C. 391, 391a, 392, 404, 435, 481, 489, 367, 526p, 1333, 390b, 43 U.S.C. 1333, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-15, Jan. 3, 1955, 20 FR 820; CGFR 56-28, July 24, 1956, 21 FR 5659; 167-38, Oct. 26, 1959, 24 FR 8857.

SOURCE: CGFR 59-22, 24 FR 4961, June 18, 1959, unless otherwise noted.

§ 160.053-1 Applicable specifications.

(a) *Specification.* The following specification of the issue in effect on the date unicellular plastic foam work vests are manufactured, form a part of this subpart:

(1) Military specification: MIL-L-17653A—Life Preserver, Vest, Work Type, Unicellular Plastic.

(b) *Copies on file.* Copies of the specification referred to in this section, as well as the various specifications forming a part thereof, shall be kept on file by the manufacturer, together with the certificate of approval. They shall be kept for a period consisting of the duration of approval and 6 months after termination of approval. Federal specifications may be purchased from the Business Service Center, General Services Administration, Washington, D.C. 20407. Military specifications may be obtained from the Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, Pa. 19120.

(c) *Permissible extension.* Manufacturers of workvests having approval numbers issued prior to April 30, 1973, may continue to mark the devices under the terms of that approval until November 1, 1973. Those manufacturers having approval numbers issued after April 30, 1973, shall comply with the requirements of this subpart.

[CGFR 59-22, 24 FR 4961, June 18, 1959, as amended by CGFR 65-16, 30 FR 10899 Aug. 21, 1965; CGD 72-163, 38 FR 8120, Mar. 28, 1973; CGD 78-012, 43 FR 27154, June 22, 1978]

§ 160.053-2 Type.

(a) Unicellular plastic foam work vests specified by this subpart shall be of the type described in Military Specification MIL-L-17653A, but alternate designs equivalent in materials, construction, performance, and workmanship will be given consideration.

§ 160.053-3 Materials, construction and workmanship.

(a) *General.* The materials, construction and workmanship of unicellular plastic foam work vests specified by this subpart shall conform to the requirements of Military Specification MIL-L-17653A, except as otherwise specifically provided by this subpart.

(b) *Color of envelope.* Indian Orange, Cable No. 70072, Standard Color Card of America, will be acceptable in lieu of the Scarlet-Munsell 7.5 red 6/10 color specified for envelopes or covers by paragraph 3.1.1.1 of Specification MIL-L-17653A.

(c) *Color of webbing and thread.* The color of the webbing and thread need not match the color of the envelope as specified by paragraphs 3.1.3 and 3.2.8 of Specification MIL-L-17653A.

§ 160.053-4 Inspections and tests.

(a) *General.* Work vests are not inspected at regularly scheduled factory inspections; however, the Commander of the Coast Guard District may detail a marine inspector at any time to visit any place where work vests are manufactured to observe production methods and to conduct any inspections or tests which may be deemed advisable. The marine inspector shall be admitted to any place in the factory where work is done on work vests or component materials, and samples of materials entering into construction may be taken by the marine inspector and tests made for compliance with the applicable requirements.

(b) *Manufacturer's inspections and tests.* Manufacturers of approved work vests shall maintain quality control of the materials used, manufacturing methods, workmanship, and the finished product so as to meet the requirements of this specification, and shall make full inspections and tests of representative samples from each lot to maintain the quality of their product.

(c) *Lot size.* A lot shall consist of not more than 500 work vests manufactured at the same time. Lots shall be numbered serially by the manufacturer, and if at any time during the manufacture of a lot, any change or modification in materials or production methods is made, a new lot shall be started.

(d) *Test facilities.* The manufacturer shall provide a suitable place and shall have on hand the necessary apparatus for conducting buoyancy tests in compliance with this specification. The apparatus shall include accurate spring scales of adequate capacity, weighted wire mesh baskets, and a test tank or tanks which can be locked or sealed in such a manner as to preclude disturbance of work vests undergoing tests or change in water level.

(e) *Buoyancy*—(1) *Buoyancy test method.* Remove the buoyant inserts from the vest. Securely attach the spring scale in a position directly over the test tank. Suspend the weighted wire basket from the scale in such a manner that the basket can be weighed while it is completely under water. In order to measure the actual buoyancy provided by the inserts, the underwater weight of the empty basket should exceed the buoyancy of the inserts. To obtain the buoyancy of the inserts, proceed as follows:

(i) Weigh the empty wire basket under water.

(ii) Place the inserts inside the basket and submerge it so that the top of the basket is at least 2 inches below the surface of the water. Allow the inserts to remain submerged for 24 hours. The tank shall be locked or sealed during this 24-hour submergence period.

(iii) After the 24-hour submergence period, unlock the tank and weigh the wire basket with the inserts inside while both are still under water.

(iv) The buoyancy is computed as paragraph (e)(1)(i) of this section minus paragraph (e)(1)(iii) of this section.

(2) *Buoyancy required.* The buoyant inserts from work vests shall provide not less than 17½ pounds buoyancy in fresh water.

§ 160.053-5 Marking.

(a) Each work vest must have the following information clearly printed in waterproof lettering that can be read at a distance of 2 feet:

Type V—Personal flotation device.
Inspected and tested in accordance with U.S. Coast Guard regulations.
(Name of buoyant material) buoyant material provides a minimum buoyant force of 17½ lbs.
Approved for use on Merchant Vessels as a work vest.

U.S. Coast Guard Approval No. 160.053/(assigned manufacturer's No.)/(Revision No.); (Model No.).
(Name and address of manufacturer or distributor.)
(Lot No.)
This vest is filled with (name of buoyant material), which will not be harmed by repeated wetting. Hang up and dry thoroughly when vest is wet.

(b) *Additional marking required.* In addition to the wording included on the marking tag, on a front compartment of each work vest there shall be stenciled in waterproof ink in letters not less than one inch in height, the words, "WORK VEST ONLY."

(c) *Waterproofness of marking tags.* Marking tags shall be sufficiently waterproof so that after 48 hours submergence in water, they will withstand rubbing by hand with moderate pressure while wet without the printed matter becoming illegible.

[CGFR 59-22, 24 FR 4961, June 18, 1959, as amended by CGD 72-163R, 38 FR 8121, Mar. 28, 1973; CGD 75-008, 43 FR 9771, Mar. 9, 1978]

§ 160.053-6 Procedure for approval.

(a) *General.* Work vests for use on merchant vessels are approved only by the Commandant, U.S. Coast Guard, Washington, D.C. 20226. Application for approval and correspondence pertaining to this specification shall be addressed to the Commander of the Coast Guard District in which the factory is located.

(b) *Pre-approval samples and tests.* Upon receipt of an application for approval of work vests, the Commander of the Coast Guard District will detail a marine inspector to the factory to observe the production facilities and manufacturing methods and to select, from not less than ten work vests already manufactured, not less than three for examination and test for compliance with the requirements of this specification. A copy of the marine inspector's report, together with a fourth specimen vest and one set of pad inserts selected from those already manufactured will be forwarded to the Commandant, and if satisfactory, an official approval number will be assigned to the manufacturer for the work vest submitted.

[CGFR 59-22, 24 FR 4961, June 18, 1959, as amended by CGFR 65-16, 30 FR 10899, Aug. 21, 1965]

Subpart 160.054—Kits, First-Aid, for Inflatable Liferafts

AUTHORITY: R.S. 4417a, as amended, 4488, as amended, 4491, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, sec. 3, 54 Stat. 347, sec. 3, 70 Stat. 152, sec. 4, 67 Stat. 462, and sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 481, 489, 367, 1333, 390b, 43 U.S.C. 1333, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-20, June 18, 1956, 21 FR 4894; 167-38, Oct. 26, 1959, 24 FR 8857.

SOURCE: CGFR 60-36, 25 FR 10637, Nov. 5, 1960, unless otherwise noted.

§ 160.054-1 Applicable specification.

(a) *Specification.* The following specification of the issue in effect on the date first aid kits are manufactured forms a part of this subpart:

(1) Coast Guard specification 160.041—Kits, First-Aid.

(b) *Copies on file.* Copies of the specification regulations referred to in this section shall be kept on file by the manufacturer, together with the approved plans and certificate of approval. They shall be kept for a period consisting of the duration of approval and 6 months after termination of approval. The Coast Guard specification may be obtained from the Commandant, U.S. Coast Guard, Washington, D.C. 20226.

[CGFR 60-36, 25 FR 10637, Nov. 5, 1960, as amended by CGFR 65-16, 30 FR 10899, Aug. 21, 1965]

§ 160.054-2 Type and size.

(a) *Type.* First-aid kits covered by this specification shall be of the watertight type. Alternate arrangements of materials meeting the performance requirements of this specification will be given special consideration.

(b) *Size.* First-aid kits shall be of a size adequate for packing 12 standard single cartons of the kind indicated in specification Subpart 160.041.

§ 160.054-3 Construction.

(a) *Construction.* The container shall be constructed of tough transparent material, not less than .008 inch nominal thickness, properly sealed around three edges, and having the fourth edge closed in such manner that it is capable of being opened and reclosed watertight. The re-openable closure may be a plastic zip seal closure without slider, or other means which meet the test requirements of § 160.054-5.

§ 160.054-4 Contents.

(a) *Individual cartons.* Cartons and their contents shall be the type indicated in Specification Subpart 160.041.

(b) *Items.* The items contained in first-aid kit shall be as listed in Table 160.054-4(b).

Table 160.054-4(b)—ITEMS FOR FIRST-AID KIT

Item	No. per pkg.	Size of pkg.	No. of pkgs.
Bandage compress—4 inches	1	Single	1
Bandage compress—2 inches	4	Single	1
Waterproof adhesive compress—1 inch	16	Single	1
Eye dressing packet, ⅛ oz. Ophthalmic ointment, adhesive strips, cotton pads	3	Single	1
Bandage, gauze, compressed, 2 inches x 6 yards	2	Single	1
Tourniquet, forceps, scissors, 12 safety pins	1, 1, 1, and 12, respectively.	Double	1
Wire splint	1	Single	1
Ammonia inhalants	10	Single	1
Iodine applicators, (½ ml swab type)	10	Single	1
Aspirin, phenacetin and caffeine compound, 6½ Gr. tablets, vials of 20	2	Single	1
Sterile petrolatum gauze, 3 inches by 18 inches	4	Single	1

(c) *Instructions.* Instructions for the use of the contents of the first-aid kit shall be printed in legible type and either shall be placed inside the container or printed on the container in waterproof ink. The instructions for the use of the contents are as indicated in Specification Subpart 160.041, except that the triangular bandage is omitted.

§ 160.054-5 Inspections and tests.

(a) *General.* First-aid kits specified by this subpart are not inspected at regularly scheduled factory inspections of production lots, but the Commander of the Coast Guard District in which the kits are manufactured may detail an inspector at any time to visit any place where approved kits are manufactured to check materials and construction methods and to conduct such examinations and tests as may be required to satisfy himself that the first-aid kits are being manufactured in accordance with the requirements of this subpart and in accordance with the manufacturer's plans and specifications approved by the Commandant.

(b) *Salt spray.* The container shall be exposed to a spray of 20 percent by weight of reagent grade sodium chloride at about 95° F. for 100 hours. There shall be no disintegration of the material as a result of this test.

(c) *Container Watertightness.* With the required number of items inside, the closed container, with reclosable edge uppermost, shall be submerged under a head of one foot of water for a period of two hours. At the end of this period, the container shall be removed, surface dried, opened, and examined for the presence of moisture. No seepage shall be allowed.

§ 160.054-6 Marking.

(a) Each approved first-aid kit shall be plainly and permanently marked with the following information: Name and address of the manufacturer, model number or other manufacturer's identification of the kit, the Coast Guard approval number, and the words "First-Aid Kit—For Inflatable Life Rafts". If the means for opening and re-closing are not self-evident, suitable directions shall be marked along the closure; such as, for the zip seal closure, an arrow, with the words "To Open, Lift by Thumb Nail", and "To Close, Press Together Full

Length". The marking may be applied to the container by the silk screen process, using a suitable ink or paint, or may be applied by other means shown to be acceptable.

§ 160.054-7 Procedure for approval.

(a) *General.* First-aid kits for use in conjunction with lifesaving equipment on board merchant vessels are approved only by the Commandant, U.S. Coast Guard, Washington, D.C., 20226. Correspondence pertaining to the subject matter of this specification shall be addressed to the Commander of the Coast Guard District in which the kits are manufactured.

(b) *Manufacturer's plans.* In order to obtain approval, submit detailed plans showing fully the construction, material specification, arrangement, and list of contents to the Commander of the Coast Guard District in which the factory is located. Each drawing shall have an identifying number, and date, and shall indicate the manufacturer's symbol, trade name, or other identification for the first-aid kit. At the time of selection of the pre-approval sample, the manufacturer shall furnish the inspector four copies of all plans and specifications, corrected as may be required, for forwarding to the Commandant.

(c) *Pre-approval sample.* After the first drawings have been examined and found to appear satisfactory, a marine inspector will be detailed to the factory to observe the manufacturing facilities and methods and to obtain two samples, complete with contents which will be forwarded, prepaid by the manufacturer, to the Commandant for the necessary conditioning and tests in accordance with § 160.054-5 to determine the suitability of the first-aid kit for use in conjunction with lifesaving equipment on board merchant vessels. The cost of the tests shall be borne by the manufacturer.

[CGFR 60-36, 25 FR 10637, Nov. 5, 1960, as amended by CGFR 65-16, 30 FR 10899, Aug. 21, 1965]

Subpart 160.055—Life Preservers, Unicellular Plastic Foam, Adult and Child, for Merchant Vessels

AUTHORITY: R.S. 4417a, as amended, 4426, as amended, 4488, as amended, 4491, as amended, secs. 1, 2, 49 Stat. 1544, as amended, secs. 6, 17, 54 Stat. 164, as amended, 166, as amended, sec. 3, 54 Stat 347, as amended, sec. 3, 70 Stat. 152, sec. 4, 67 Stat. 462, and sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 404, 481, 489, 367, 526e, 526p, 1333, 390b, 43 U.S.C. 1333, 50 U.S.C. 198; E.O. 11239, July 31, 1965, 30 FR 9671. Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-15, Jan. 3, 1955, 20 FR 820; 167-20, June 18, 1956, 21 FR 4894; CGFR 56-28, July 24, 1956, 21 FR 5659; 167-38, Oct. 26, 1959, 24 FR 8857.

SOURCE: CGFR 66-73, 32 FR 5500 Apr. 4, 1967, unless otherwise noted.

§ 160.055-1 Incorporation by reference.

(a) *Specifications and Standards.* This subpart makes reference to the following documents:

(1) *Military Specifications:*

MIL-W-530F—Webbing, Textile, Cotton, General Purpose, Natural or in Colors.
MIL-T-3530E—Thread and Twine; Mildew Resistant or Water Repellant Treated.
MIL-W-17337D—Webbing, Woven, Nylon.
MIL-C-43006D—Cloth and Strip Laminated, Vinyl-Nylon High Strength, Flexible.

(2) Federal Specifications:

CCC-C-700G—Cloth, Coated, Vinyl, Coated (Artificial Leather).
CCC-C-426D—Cloth, Drill, Cotton.

(3) Federal Standards:

No. 191—Textile Test Methods.
No. 595A—Color.
No. 751A—Stitches, Seams, and Stitchings.

(4) American Society for Testing and Materials (ASTM) Standards:

D413—Adhesion of Vulcanized Rubber (Friction Test).
D570—Water Absorption of Plastics.
D882—Tensile Properties of Thin Plastic Sheets and Films.
D1004—Tear Resistance of Plastic Film and Sheeting.

(5) Coast Guard specification:

164.015—Plastic Foam, Unicellular, Buoyant, Sheet and Molded Shape.

(b) *Plans.* The following plans, of the issue in effect on the date unicellular plastic foam life preservers are manufactured, form a part of this subpart:

Dwg. No. 160.055-IA:
  Sheet 1—Construction and Arrangement, Vinyl Dip Coated, Model 62, Adult.
  Sheet 2—Construction and Arrangement, Vinyl Dip Coated, Model 66, Child.
Dwg. No. 160.055-IB:
  Sheet 1—Construction and Arrangement, Cloth Covered, Model 63, Adult.
  Sheet 2—Buoyant Inserts, Model 63.
  Sheet 3—Construction and Arrangement, Cloth Covered, Model 67, Child.
  Sheet 4—Buoyant Inserts, Model 67.

(c) *Copies on file.* Copies of the specifications, standards, and plans referred to in this section shall be kept on file by the manufacturer, together with the approved plans and certificate of approval. The Coast Guard Specification and plans may be obtained upon request from the Commandant, U.S. Coast Guard, Washington, D.C. 20590. The Federal Specifications and the Federal Standards may be purchased from the Business Service Center, General Services Administration, Washington, D.C. 20407. The Military Specifications may be obtained from the Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, Pa. 19120. The ASTM Standards may be purchased from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pa. 19103.

[CGFR 66-73, 32 FR 5500, Apr. 4, 1967, as amended by CGD 72-163R, 38 FR 8121, Mar. 28, 1973; CGD 78-012, 43 FR 27153, 27154, June 22, 1978]

§ 160.055-2 Type and model.

Each life preserver specified in this subpart is a:

(a) Standard, bib type, vinyl dip coated:

(1) Model 62, adult (for persons weighing over 90 pounds); or

(2) Model 66, child (for persons weighing less than 90 pounds); or

(b) Standard, bib type, cloth covered;

(1) Model 63, adult (for persons weighing over 90 pounds); or

(2) Model 67, child (for persons weighing less than 90 pounds); or

(c) Nonstandard, shaped type:

(1) Model,[1] adult (for persons weighing over 90 pounds); or

(2) Model,[1] child (for persons weighless than 90 pounds).

[CGD 72-163R, 38 FR 8121, Mar. 28, 1973]

§ 160.055-3 Materials—standard life preservers.

(a) *General.* All materials used in the construction shall be obtained from suppliers who furnish an affidavit certifying that the material meets the requirements of the applicable reference specifications. The requirements for materials specified in this section are minimum requirements, and consideration will be given to the use of alternate materials in lieu of those specified. Detailed technical data and samples of all proposed alternate materials shall be submitted for acceptance prior to being incorporated in the finished product.

(b) *Unicellular plastic foam.* The unicellular plastic foam shall be all new material complying with the requirements of Subpart 164.015 of this chapter for Type A foam.

(c) *Envelope.* The life preserver envelope, or cover, shall be made of cotton drill. The color shall be Indian Orange, Cable No. 70072, Standard Color Card of America, issued by the Textile Color Association of the United States, Inc., 200 Madison Avenue, New York, N.Y., or Scarlet Munsell 7.5 Red 6/10. The drill shall be evenly dyed, and the fastness of the color to laundering, water, crocking, and light shall be rated "good" when tested in accordance with Federal Test Method Standard No. 191, Methods 5610, 5630, 5650, and 5660. After dyeing, the drill shall be treated with a mildew-inhibitor of the type specified in paragraph (e) of this section. The finished goods shall contain not more than 2 percent residual sizing or other nonfibrous material, shall weigh not less than 6.5 ounces per square yard, shall have a thread count of not less than 74 in the warp and 56 in the filling, and shall have a breaking strength (grab method) of not less than 105 pounds in the warp and 70 pounds in the filling. Properly mildew-inhibited drills meeting the physical requirements of Federal Specification CCC-C-426 for Type I, Class 3 drill will be acceptable. If it is proposed to treat the fabric with a fire-retardant substance, full details shall be submitted to the Commandant for determination as to what samples will be needed for testing.

---

[1] A model designation for each nonstandard life preserver is to be assigned by the manufacturer. That designation must be different from any standard lifesaving device designation.

(d)(1) *Thread.* Each thread must meet § 160.001-2(j). Only one kind of thread may be used in each seam.

(2) *Nylon thread.* This thread shall be Class I, Type I, or II, Size E, nylon thread in accordance with the requirements of Federal Specification V-T-295.

(e) *Mildew-inhibitor.* The mildew-inhibitor shall be dihydroxydichloro-diphenylmethane, known commercially as Compound G-4, applied by the aqueous method. The amount of inhibitor deposited shall be not more than 1.50 percent and not less than 1 percent of the dry weight of the finished goods.

(f) *Adhesive.* The adhesive shall be an all-purpose waterproof vinyl type. (Minnesota Mining and Manufacturing Co. EC-870 or EC-1070, United States Rubber Co. M-6256, Herculite Protective Fabrics Corp., CVV, Pittsburgh Plate Glass Co. R 828, or equal.)

(g) *Reinforcing fabric.* The reinforcing fabric shall be Type III, Class I, laminated vinyl-nylon high strength cloth in accordance with the requirements of Specification MIL-C-43006.

(h) *Webbing.* There are no restrictions as to color, but the fastness of the color to laundering, water, crocking, and light shall be rated "good" when tested in accordance with Federal Test Method Standard No. 191, Methods 5610, 5630, 5650, and 5660. The complete body strap assembly shall have a minimum breaking strength of 360 pounds.

(1) *Nylon webbing.* This webbing shall be 1-inch wide nylon webbing in accordance with the requirements of Specification MIL-W-17337.

(2) *Cotton webbing.* This webbing shall be 1-inch cotton webbing meeting the requirements of Specification MIL-W-530 for Type IIb webbing. This webbing shall be treated with a mildew-inhibitor of the type specified in paragraph (e) of this section.

(i) *Hardware.* All hardware shall be brass, bronze, or stainless steel, and of the approximate size indicated by the drawings. Steel hardware, protected against corrosion by plating, is not acceptable. Snap hook springs shall be phosphor bronze or other suitable corrosion-resistant material. Dee ring, o-ring, slide adjuster and snap hook ends shall be welded or brazed, or they may be a one-piece casting. The complete body strap assembly shall have a minimum breaking strength of 360 pounds.

(j) *Coating.* The coating for the plastic foam shall be a liquid elastomeric vinyl compound. The coating shall be International Orange in color (Color No. 12197 of Federal Standard 595) or Scarlet Munsel 7.5, Red 6/10 and shall meet the following requirements in Table 160.055-3(j):

TABLE 160.055-3(j)

Property	Test method	Requirement
Tensile strength	ASTM-D882, Method B, ½ in. dumbbell die	1,200 p.s.i., minimum.
Ultimate elongation	ASTM-D882, Method B, ½ in. dumbbell die	320 percent, minimum.
Tear resistance	ASTM-D1004, Constant Elongation Machine	90 pounds per inch, minimum.
Abrasion resistance	FS CCC-T-191, Method 5304, No. 8 cotton duck, 6 lb. tension, 2 lb. pressure.	100,000 double rubs.
Blocking	FS CCC-T-191, Method 5872, 30 minutes at 180° F., ¼ p.s.i.	No blocking.
Accelerated weathering	FS CCC-T-191, Method 5670, 120 hours	Color change—very slight. Cracking—None. Flexibility—No change.
Plasticizer heat loss	FS CCC-A-700, paragraph 4.4.4, 48 hours at 221° F.	8 percent, maximum.
Adhesion to foam—Tensile pull	ASTM-D413, machine method, 12 in. per minute, 1 in. strip.	
Film to foam skin		4 lb./in., minimum.

TABLE 160.055-3(j)—Continued

Property	Test method	Requirement
Film to foam (no skin)		2 lb./in., minimum.
Water absorption	ASTM-D570, 24 hours at 70° F	0.5 percent, maximum.
Cold crack (unsupported film) 0° F	Coast Guard, 164.015, paragraph 164.015-4(j)	No cracking.

[CGFR 66-73, 32 FR 5500, Apr. 4, 1967, as amended by CGD 72-163R, 38 FR 8121, Mar. 28, 1973; CGD 78-012, 43 FR 27153, 27154, June 22, 1978]

§ 160.055-4 Materials—nonstandard life preservers.

All materials used in nonstandard life preservers must be equivalent to those specified in § 160.055-3 for standard life preservers.

[CGD 72-163R, 38 FR 8121, Mar. 28, 1973]

§ 160.055-5 Construction—Standard life preservers.

(a) *General.* This specification covers life preservers which essentially consist of plastic foam buoyant material arranged and distributed so as to provide the flotation characteristics and buoyancy required to hold the wearer in an upright or slightly backward position with head and face clear of the water. The life preservers are also arranged so as to be reversible and are fitted with straps and hardware to provide proper adjustment and fit to the bodies of various size wearers.

(b) *Construction—standard, vinyl dip coated life preserver.* This device is constructed from one piece of unicellular plastic foam with neck hole and the body slit in the front, vinyl dip coating, and fitted and adjustable body strap.

(1) *Buoyant material.* The buoyant material of the life preserver shall be a molded shape or made from one or two sheets of foam finished so as to have dimensions after coating in accordance with the pattern shown on Dwg. No. 160.055-1A, Sheet 1, for adult size and Sheet 2 for child size. The reinforcing fabric shall be cemented on the foam buoyant body before coating.

(2) *Coating.* After all cutting and shaping of the buoyant body and installation of the reinforcing fabric, the entire body of the life preserver shall be coated evenly and smoothly to a minimum thickness of 0.010″ with a liquid vinyl coating material of the type described in § 160.055-3(j).

(3) *Body strap.* After the coating on the buoyant body of the life preserver is fully cured, a nylon webbing body strap shall be attached as shown on Dwg. No. 160.055-IA.

(4) *Stitching.* All stitching shall be a short lock stitch, conforming to Stitch Type 301 of Federal Standard 751, with nylon thread, and there shall be not less than 9 nor more than 11 stitches to the inch. Bar tacking with nylon thread is acceptable as noted on Dwg. No. 160-055-IA.

(c) *Construction—standard, cloth covered life preserver.* This device is constructed from three sections of unicellular plastic foam contained in a cloth envelope and has a neck hole, the body slit in the front, and a fitted and adjustable body strap.

(1) *Buoyant material.* The buoyant material of the life preserver shall be three sections of foam cut so as to have finished dimensions in accordance with the patterns shown on Dwg. No. 160.055-IB, Sheet 2, for adult size and Sheet 4, for child size. One or two layers of foam may be used to make up each section.

(2) *Envelope.* The envelope shall be cut to the pattern shown on Dwg. No. 160.055-IB, Sheet 1, for adult size, and Sheet 3, for child size, and joined by seams and stitching as shown on the drawing. Alternate finished envelopes are permitted as noted on Dwg. No. 160.055-IB.

(3) *Body strap.* The body strap may be cotton or nylon webbing and shall be attached by stitching as shown on the Dwg. No. 160.055-IB, Sheet 1, for adult size and Sheet 3, for child size.

(4) *Stitching.* All stitching shall be a short lock stitch conforming to Stitch Type 301 of Federal Standard No. 751, and there shall be not less than 7 nor

more than 9 stitches to the inch if cotton thread is used, and not less than 9 nor more than 11 if nylon thread is used. Bar tacking is acceptable as noted on Dwg. No. 160.055-IB.

(d) *Workmanship.* Life preservers shall be of first-class workmanship and shall be free from any defects materially affecting their appearance or service-ability.

[CGFR 66-73, 32 FR 5500, Apr. 4, 1967, as amended by CGD 72-163R, 38 FR 8121, Mar. 28, 1973]

§ 160.055-6 Construction—nonstandard, life preservers.

(a) *General.* The construction methods used for a nonstandard life preserver must be equivalent to the requirements in § 160.055-5 for a standard life preserver and also meet the requirements in this section.

(b) *Size.* Each nonstandard life preserver must contain the following volume of plastic foam buoyant material, determined by the displacement method:

(1) 700 cubic inches or more for an adult size;

(2) 350 cubic inches or more for a child size.

(c) *Arrangement of buoyant materials.* The buoyant material in nonstandard life preservers must:

(1) Be arranged to hold the wearer in an upright or backward position with head and face out of water;

(2) Have no tendency to turn the wearer face downward in the water; and

(3) Be arranged so that 68 to 73 percent of the total is located in the front of the life preserver.

(d) *Adjustment, fit, and donning.* Each nonstandard life preserver must be capable of being:

(1) Worn reversed;

(2) Adjusted to fit a range of wearers for the type designed; and

(3) Donned in a time comparable to that of a standard life preserver.

[CGD 72-163R, 38 FR 8121, Mar. 28, 1973]

§ 160.055-7 Sampling, test, and inspections—standard and nonstandard life preservers.[1]

(a) *General.* When production is to commence on life preservers, the manufacturer shall notify the Officer in Charge, Marine Inspection, U.S. Coast Guard, of the inspection zone in which the factory is located in sufficient time for him to assign a Coast Guard Marine Inspector to the plant to observe production methods and to conduct any inspections or tests which may be deemed advisable. Manufacturers of approved life preservers shall maintain quality control of the materials used, manufacturing operations, and the finished product so as to meet the requirements of this specification. When a lot of life preservers is presented for Coast Guard inspection, it is expected that the manufacturer will previously have taken all ordinary precautions to assure himself that the life preservers are in full compliance with the requirements of this specification. The Coast Guard inspections and tests are not intended to replace, or be a substitute for, full inspections and tests by the manufacturer to maintain the quality of his product. The Marine Inspector shall be admitted to any place in the factory where work is done on the life preservers or on component materials or parts. Samples of materials entering into construction may be taken by the marine inspector and tests made for compliance with the applicable requirements.

(b) *Lot size and sampling.* (1) A lot shall consist of not more than 500 life preservers. A new lot shall be started with any change or modification in materials used or manufacturing methods employed. When a lot of life preservers is ready for inspection, the manufacturer shall notify the Officer in Charge, Marine Inspection, U.S. Coast Guard, of the inspection zone in which the factory is located, who will assign a marine inspector to the plant for the purpose of making the necessary tests and inspections. From each lot of life preservers the Marine Inspector shall select samples in accordance with Table 160.055-7(b)(1) to be tested for buoyancy in accordance with paragraph (d) of this section.

---

[1] The manufacturer of a personal flotation device must meet 33 CFR 181.701 through 33 CFR 181.705 which require an instruction pamphlet for each device that is sold or offered for sale for use on recreational boats.

TABLE 160.055-7(b)(1)—SAMPLING FOR BUOYANT TESTS

Lot size	Number of life preservers in sample
100 and under	1
101 to 200	2
201 to 300	3
301 to 500	4

(2) For a lot next succeeding one from which any life preservers failed the buoyance test, the sample shall consist of not less than 10 specimen life preservers to be tested for buoyance in accordance with paragraph (d) of this section.

(c) *Test facilities.* The manufacturer shall provide a suitable place and the necessary apparatus for the use of the marine inspector in conducting tests to determine compliance of life preservers with this specification. The apparatus shall include accurate spring scales of adequate capacity, weighted wire mesh baskets, and a test tank or tanks which can be locked or sealed in such manner as to preclude disturbance of life preservers undergoing test or change in water level.

(d) *Buoyancy test.* Securely attach the spring scale in a position directly over the test tank. Suspend the weighed wire basket from the scale in such a manner that the basket may be weighted while it is completely under water. In order to measure the actual buoyancy provided by the life preserver, the underwater weight of the empty basket should exceed the buoyancy of the life preserver. To obtain the buoyancy of the life preserver, proceed as follows:

(1) Weigh the empty wire basket under water.

(2) Place the life preserver inside the basket, and submerge it so that the top of the basket is at least 2 inches below the surface of the water. Allow the life preserver to remain submerged for 24 hours. The tank shall be locked or sealed during this 24-hour submergence period. It is important that after the life preserver has once been submerged it shall remain submerged for the duration of the test, and at no time during the course of the test shall it be removed from the tank or otherwise exposed to air.

(3) After the 24-hour submergence period, unlock or unseal the tank and weigh the wire basket with the life preserver inside while both are still under water.

(4) The buoyancy is computed as paragraph (d)(1) of this section minus paragraph (d)(3) of this section.

(e) *Buoyancy required.* Adult size life preservers shall provide not less than 22 pounds buoyancy in fresh water, and child size life preservers shall provide not less than 11 pounds buoyancy.

(f) *Lot inspection.* If the sample life preserver or preservers meet the buoyancy requirement, the marine inspector shall carefully inspect individually each of the life preservers in the lot, making such examinations and tests as are necessary to satisfy himself that the life preservers have been manufactured according to the applicable requirements. Nonconforming units shall be eliminated. The manufacturer shall provide a well lighted place equipped with a suitable smooth top table for use by the marine inspector, and shall provide labor for all handling of life preservers requisite for lot inspection.

(g) *Lot acceptance.* When the marine inspector has satisfied himself that the life preservers in the lot are of a type officially approved in the name of the company, and that such life preservers meet the applicable requirements, they shall be plainly marked in waterproof ink with the words, "Inspected and Passed, (Date), Marine Inspection Office identification letters, USCG."

(h) *Lot rejection.* If any sample life preserver fails the buoyancy test, 10 additional specimen life preservers shall be selected from the lot and tested for buoyancy. If all the 10 additional specimen life preservers pass the buoyancy test, the lot shall be considered for lot inspection as set forth in paragraph (f) of this section. If any one of the 10 additional specimen life preservers fails the buoyancy test, the lot shall be rejected. If, in the lot inspection, three or more nonconforming units are eliminated for the same kind of defect, lot inspection shall be discontinued until such time as the manufacturer has inspected the remainder of the lot and eliminated or corrected any additional units having the same kind of defect. Nonconforming units which are eliminated in the lot inspection may be resubmitted for inspection, provided that all defects have been corrected to the satisfaction of the marine inspector. When permitted by the Commander of the Coast Guard District, rejected lots may be reworked by the manufacturer to correct the deficiency for which they were rejected and to eliminate all nonconforming units, following which the remainder of the lot may be resubmitted for official testing and inspection. Life preservers from rejected lots may not, unless subsequently accepted, be sold or offered for sale under representation as being in compliance with this specification or as being approved for use on merchant vessels or motorboats.

(i) *Additional tests for nonstandard life preservers.* Tests in addition to those required by this section may be required for nonstandard life preservers to determine performance equivalence to a standard preserver. Such additional tests may include determining performance in the water, suitability of materials, donning time, ease of adjustment, and similar equivalency tests. Costs for any additional tests must be assumed by the manufacturer.

(46 U.S.C. 375, 416; 49 U.S.C. 1655(b); 49 CFR 1.4(b), and 1.46)

[CGFR 66-73, 32 FR 5500, Apr. 4, 1967, as amended by CGD 72-163R, 38 FR 8121, Mar. 28, 1973; CGD 75-186, 41 FR 10437, Mar. 11, 1976; CGD 75-008, 43 FR 9772, Mar. 9, 1978]

§ 160.055-8 Marking.

Each life preserver must have the following information clearly marked in waterproof lettering:

(a) In letters three-fourths of an inch or more in height;

(1) Adult (for persons weighing over 90 pounds); or

(2) Child (for persons weighing less than 90 pounds).

(b) In letters that can be read at a distance of 2 feet:

Type I or Type V Personal Flotation Device.

Inspected and tested in accordance with U.S. Coast Guard regulations.

(Name of buoyant material) buoyant material provides a minimum buoyant force of (22 lb. or 11 lb.).

Approved for use on all vessels by persons weighing (90 lb. or more, or less than 90 lb.).

U.S. Coast Guard Approval No. 160.055/(assigned manufacturer's No.)/(Revision No.); (Model No.).

(Name and address of manufacturer or distributor).

(Lot No.)

[CGD 72-163R, 38 FR 8121, Mar. 28, 1973, as amended by CGD 75-008, 43 FR 9771, Mar. 9, 1978; 43 FR 10913, Mar. 11, 1978]

§ 160.055-9 Procedure for approval—standard and nonstandard life preservers.

(a) *General.* Life preservers for use on merchant vessels or motorboats are approved only by the Commandant, U.S. Coast Guard, Washington, D.C. 20590. Each model life preserver is considered separately. Application for approval and correspondence pertaining to the subject matter of this specification shall be addressed to the Commander of the Coast Guard District in which the factory is located.

(b) *Assignment of inspector; standard life preservers.* Upon receipt of an approval of a standard life preserver, a Coast Guard inspector is assigned to the factory to:

(1) Observe the production facilities and manufacturing methods;

(2) Select from a lot of 10 manufactured life preservers or more, three or more of each model for examination;

(3) Test the selected sample for compliance with the requirements of this subpart; and

(4) Forward to the Commandant a copy of his report of the tests and the production and manufacturing facilities, a specimen life preserver selected from those already manufactured but not tested, and one copy of an affida-

vit for each material used in the life preservers.

(b-1) *Approval number—standard life preserver.* An approval number is assigned to the manufacturer by the Coast Guard for a standard life preserver found to be in compliance with the requirements of this subpart.

(c) *Assignment of inspector—nonstandard life preserver.* Upon receipt of an application from a manufacturer for approval of nonstandard life preservers, an inspector is assigned to the factory to:

(1) Observe the production facilities and manufacturing methods;

(2) Select three samples of life preservers of each model for which approval is desired;

(3) Forward to the Commandant:

(i) Three samples of each model of life preserver;

(ii) A copy of the inspector's report of tests and the production and manufacturing facilities; and

(iii) Four copies each of fully dimensioned, full-scale drawings showing all details of construction of the sample life preservers submitted, material affidavits, and four copies of a bill of materials showing all materials used in construction of the life preservers submitted by the manufacturer.

(c-1) *Approval number—nonstandard life preserver.* An official approval number is assigned to the manufacturer by the Coast Guard for a nonstandard life preserver approved after tests.

(d) *Private brand labels.* Private brand labels are those bearing the name and address of a distributor in lieu of the manufacturer. In order for a manufacturer to apply for an approval number to be used on such a private brand label, he shall forward a letter of request to the Commander of the Coast Guard District in which the factory is located, setting forth the life preservers involved, together with a letter from his distributor also requesting that approval be issued. The manufacturer's request for approval together with that of his distributor, will be forwarded to the Commandant, and when deemed advisable, an approval number or numbers will be issued in the name of the distributor. Approvals issued to a distributor under such an arrangement shall apply only to life preservers made by the manufacturer named on the certificate of approval, and this manufacturer shall be responsible for compliance of the life preservers with the requirements of this subpart.

[CGFR 66-73, 32 FR 5500, Apr. 4, 1967, as amended by CGD 163R, 38 FR 8121, Mar. 28, 1973; CGD 78-012, 43 FR 27154, June 22, 1978]

Subpart 160.056—Rescue Boat

AUTHORITY: R.S. 4417a, as amended, 4426, as amended, 4488, as amended, 4491, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, sec. 3, 54 Stat. 347, as amended, sec. 3, 70 Stat. 152, sec. 3, 68 Stat. 152, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 404, 481, 489, 367, 1333, 390b, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-20, June 18, 1956, 21 FR 4894; 167-38, Oct. 26, 1959. 24 FR 8857.

SOURCE: CGFR 61-15, 26 FR 9300, Sept. 30, 1961, unless otherwise noted.

§ 160.056-1 General requirements.

(a) Rescue boats accepted and in use prior to the effective date of this subpart may be continued in service if in satisfactory condition.

(b) All rescue boats must be properly constructed, of such form as to be readily maneuverable, and be of the open rowboat type. They shall be suitable for use of three persons.

(c) Rescue boats shall be constructed of materials acceptable to the Officer in Charge, Marine Inspection, having jurisdiction of construction.

§ 160.056-2 Construction.

(a) *General.* Rescue boats shall be square-sterned, of normal proportions, not less than 11 feet nor more than 14 feet in length. The length shall be the overall horizontal distance from bow to stern.

(b) *Construction.* The method of construction shall be such as is accepted as good engineering practice in the case of the specific material used. The hull shall be suitably stiffened to assure adequate strength.

(c) *Weight.* The weight of the rescue boat, fully equipped, shall not exceed 225 pounds.

(d) *Seats.* The rescue boat shall be fitted with three thwarts. The middle thwart shall be arranged as the rowing seat.

(e) *Internal buoyancy.* Buoyant material of suitable unicellular plastic foam shall be installed in the rescue boat. This material shall be protected from mechanical damage. It shall be distributed uniformly in the boat and such that at least one-quarter of the required volume is located at the sides of the boat. The minimum amount of buoyant material, in cubic feet, shall be determined by the following:

$$B=2+(W-W\div d)\div 62.4-c \quad (1)$$

Where:

B=Volume of buoyant material required in cubic feet.
W=Weight of equipped boat, in pounds
d=Specific gravity of hull material.
c=Density of buoyant material, in pounds per cubic foot.

§ 160.056-3 Fittings and equipment.

(a) *Fittings.* (1) The rescue boat shall be fitted with one pair of rowlock sockets. Detachable rowlocks shall be permanently attached to the boat by chain or other suitable means.

(2) At least one eyebolt, ring, or other fitting suitable for attaching a painter shall be fitted to the bow and stern.

(b) *Equipment.* (1) The rescue boat shall be provided with one pair of oars of suitable size and material.

(2) A painter shall be attached to the bow and to the stern fittings. Each shall be of suitable material, at least ⅜-inch in diameter, and at least 30 feet long.

§ 160.056-4 Approval tests of prototype rescue boat.

(a) *Drop test.* The rescue boat, fully equipped, shall be dropped, in a free fall, from a ten-foot height into water. No damage which would render the rescue boat unserviceable shall result from this drop.

(b) *Stability and freeboard test.* The rescue boat shall have sufficient stability and freeboard so that the gunwale on the low side shall not be submerged with 350 pounds placed nine inches from the side in way of and about the level of the middle thwart.

(c) *Rescue boarding test.* With one man in the rowing position, a second kneeling on the stern thwart facing aft, and a third man balanced on the transom, the minimum freeboard of the transom shall be five inches. The men should average 165 pounds each. This test simulates the rescue of a person over the transom by a two-man boat crew.

(d) *Rowing test.* Three men, averaging 165 pounds each, shall be seated on the centerline of the boat, one on each thwart. One man, in the rowing position, using ordinary rowing technique, shall demonstrate the satisfactory course keeping and maneuvering characteristics of the boat in the ahead and astern directions.

§ 160.056-5 Inspections.

(a) Rescue boats are not inspected at regularly scheduled factory inspections; however, the Officer in Charge, Marine Inspector, may detail a marine inspector at any time to visit any place where rescue boats are manufactured to observe production methods, quality of workmanship, and compliance with material specifications, and to conduct any inspections or tests which may be deemed advisable.

(b) The manufacturer shall maintain a file of approved prints and all correspondence pertaining to the rescue boat, and make such file available to the marine inspector upon request.

(c) The marine inspector shall be admitted to any place where work is done on rescue boats or component materials and samples of materials entering into construction may be taken by the marine inspector and tests made to determine their adequacy.

§ 160.056-6 Name plate.

(a) Each rescue boat shall have permanently fitted at the transom a metal name plate, galvanically compatible with the hull material, and bearing information relating to the testing and approval of the prototype boat. Either raised or indented letters shall be used.

(b) The following information shall appear on the name plate:

RESCUE BOAT

U.S.C.G. Specification 160.056
Prototype approved ——————————
(Date)
Approved by OCMI ——————————
(Port)
Date of manufacture ——————————
(Date)
Manufacturer's serial No. ——————————
Manufacturer's name and address ————

§ 160.056-7 Procedure for approval.

(a) The manufacturer shall submit a request for approval to the Officer in Charge, Marine Inspection, having jurisdiction of the place of manufacture of the rescue boat.

(b) Formal plans will not be required. However, a combined general arrangement and construction plan is required, which includes principal dimensions, and descriptive data of hull material, buoyant material, and equipment.

(c) When plans and data are satisfactory, the Officer in Charge, Marine Inspection, will assign a marine inspector to conduct the tests required by § 160.056-4.

(d) Upon successful completion of the test, the inspector shall submit a written report to the Officer in Charge, Marine Inspection. A copy of this report, with plans and photographs, shall be forwarded to the Commandant for record purposes. The date of approval and the marine inspector's initials shall be indicated in this report.

(e) The Officer in Charge, Marine Inspection, shall issue a letter to the manufacturer indicating that approval of the rescue boat has been granted, and will include any conditions imposed. A copy of this approval letter shall be forwarded to the District Commander and to the Commandant.

(f) If a rescue boat is required on short notice, a boat may be approved on an individual basis: *Provided,* That the requirements in this subpart are met to the satisfaction of the Officer in Charge Marine Inspection. Sketches of the boat showing alterations may be submitted in lieu of the manufacturer's general arrangement and construction plan. Under these circumstances, the letter indicating that approval of the rescue boat has been granted shall be issued to the vessel using the boat.

[CGFR 61-15, 26 FR 9300, Sept. 30, 1961, as amended by CGFR 65-9, 30 FR 11480, Sept. 8, 1965]

Subpart 160.057—Floating Orange Smoke Distress Signals (15 Minutes)

AUTHORITY: 46 U.S.C. 481, 49 U.S.C. 1655(b)(1), 49 CFR 1.46(b).

SOURCE: CGD 76-048a and 76-048b, 44 FR 73091, Dec. 17, 1979, unless otherwise noted.

§ 160.057-1 Incorporations by reference.

(a) The following are incorporated by reference into this subpart:

(1) "The Color Names Dictionary" in *Color: Universal Language and Dictionary of Names,* National Bureau of Standards Special Publication 440, December 1976.

(2) "Development of a Laboratory Test for Evaluation of the Effectiveness of Smoke Signals," National Bureau of Standards Report 4792, July 1956.

(b) NBS Special Publication 440 may be obtained by ordering from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 (Order by SD Catalog No. C13.10:440).

(c) NBS Report 4792 may be obtained from the Commandant (G-MMT-3/TP12), U.S. Coast Guard, Washington, D.C. 20593.

(d) Approval to incorporate by reference the materials listed in this section was obtined from the Director of the FEDERAL REGISTER on November 1 and 29, 1979. The materials are on file in the FEDERAL REGISTER library.

§ 160.057-2 Type

(a) Floating orange. smoke distress signals specified by this subpart shall be of one type which shall consist essentially of an outer container, ballast, an air chamber, an inner container, the smoke producing composition, and an igniter mechanism. Alternate arrangements which conform to the performance requirements of this specification will be given special consideration.

§ 160.057-3 Materials, workmanship, construction, and performance requirements.

(a) *Materials.* The materials shall conform strictly to the specifications and drawings submitted by the manufacturer and approved by the Commandant. Metal for containers shall be not less than 0.5 mm (0.020 in.) in thickness. Other dimensions or materials may be considered upon special request when presented with supporting data. Igniter systems shall be of corrosion-resistant metal. The combustible material shall be of such nature that it will not deteriorate during long storage, nor when subjected to frigid or tropical climates, or both.

(b) *Workmanship.* Floating orange smoke distress signals shall be of first class workmanship and shall be free from imperfections of manufacture affecting their appearance or that may affect their serviceability.

(c) *Construction.* The outer container shall be cylindrical and of a size suitable for intended use. All sheet metal seams should be hook jointed and soldered. The whole container shall be covered with two coats of waterproof paint or other equivalent protection system. The igniter mechanism shall operate and provide ignition of the signal automatically when the ring life buoy to which it is attached is thrown overboard.

(d) *Performance.* Signals shall meet all the inspection and test requirements contained in § 160.057-4.

§ 160.057-4 Approval and production tests.

(a) *Approval tests.* The manufacturer must produce a lot of at least 20 signals from which samples must be taken for testing for approval under § 160.057-7. The approval tests are the operational tests and technical tests in paragraphs (c) and (d) of this section. The approval tests must be conducted by an independent laboratory accepted by the Commandant under § 159.010 of this Chapter.

(b) *Production inspections and tests.* Production inspections and tests of each lot of signals produced must be conducted under the procedures in § 159.007 of this Chapter. Signals from a rejected lot must not be represented as meeting this Subpart or as being approved by the Coast Guard. If the manufacturer identifies the cause of the rejection of a lot of signals, the signals in the lot may be reworked by the manufacturer to correct the problem. Samples from the rejected lot must be retested in order to be accepted. Records shall be kept of the reasons for rejection, the reworking performed on the rejected lot, and the results of the second test.

(1) *Lot size.* For the purposes of sampling the production of signals, a lot must consist of not more than 1,200 signals. Lots must be numbered serially by the manufacturer. A new lot must be started with: (i) Any change in construction details, (ii) any change in sources of raw materials, or (iii) the start of production on a new production line or on a previously discontinued production line.

(2) *Inspections and tests by the manufacturer.* The manufacturer's quality control procedures must include inspection of materials entering into construction of the signals and inspection of the finished signals, to determine that signals are being produced in accordance with the approved plans. Samples from each lot must be tested in accordance with the operational tests in paragraph (c) of this section.

(3) *Inspections and tests by an independent laboratory.* An independent laboratory accepted by the Commandant under § 159.010 of this Chapter must perform or supervise the inspections and tests under paragraph (b)(2) of this section at least 4 times a year, unless the number of lots produced in a year is less than four. The inspections and tests must occur at least once during each quarterly period, unless no lots are produced during that period. If less than four lots are produced, the laboratory must perform or supervise the inspection and testing of each lot. In addition, the laboratory must perform or supervise the technical tests in paragraph (d) of this section at least once for every ten lots of signals produced, except that the number of technical tests must be at least one but not more than four per year. If a lot of signals tested by the independent laboratory is rejected, the laboratory must perform or super-

vise the inspections and tests of the reworked lot and the next lot of signals produced. The tests of each reworked lot and the next lot produced must not be counted for the purpose of meeting the requirement for the annual number of inspections and tests performed or supervised by the independent laboratory.

(c) *Operational tests.* Each lot of signals must be sampled and tested as follows:

(1) *Sampling procedure and accept/reject criteria.* A sample of signals must be selected at random from the lot. The size of the sample must be the individual sample size in Table 160.057-4(c)(1) corresponding to the lot size. Each signal in the sample is tested as prescribed in the test procedure in paragraph (c)(2) of this section. Each signal that has a defect listed in the table of defects (Table 160.057-4(c)(2)) is assigned a score (failure percent) in accordance with that table. In the case of multiple defects, only the score having the highest numerical value is assigned to that signal If the sum of all the failure percents (cumulative failure percent) for the number of units in the sample is less than or equal to the accept criterion, the lot is accepted. If this sum is equal to or more than the reject criterion the lot is rejected.

If the cumulative failure percent falls between the accept and reject criteria, another sample is selected from the production lot and the operational tests are repeated. The cumulative failure percent of each sample tested is added to that of the previous samples to obtain the cumulative failure percent for all the signals tested (cumulative sample size). Additional samples are tested and the tests repeated until either the accept or reject criterion for the cumulative sample size is met. If any signal in the sample explodes when fired, or ignites in a way that could burn or otherwise injure the person firing it, the lot is rejected without further testing. (This procedure is diagrammed in figure 160.057-4(c)).

(2) *Test procedure.* Each sample signal (specimen) must be tested as follows:

(i) *Conditioning of test specimens—water resistance.* Immerse specimen horizontally with uppermost portion of the signal approximately 25 mm (1 in.) below the surface of the water for a period of 24 hours.

(ii) *Smoke emitting time.* Ignite specimen according to the directions printed on the signal and place signal in tub or barrel of water. The smoke emitting time of a specimen shall be obtained by stop watch measurements from the time of distinct, sustained smoke emission until it ceases. There shall be no flame emission during the entire smoke emitting time of the signal. The smoke emitting time for a specimen shall not be less than 15 minutes. When the tests are performed or supervised by an independent laboratory, this test shall be conducted with approximately 6 mm (¼ in.) of gasoline covering the water in the tub or barrel. The gasoline vapors shall not ignite during the entire smoke emitting time of the signal.

(iii) *Ignition and smoke emitting characteristics.* Test specimens shall ignite and emit smoke properly when the directions on the signal are followed. Test specimens shall not ignite explosively in a manner that might be dangerous to the user or persons close by. Test specimens shall emit smoke at a uniform rate while floating in calm to rough water. Signals should be so constructed that water submerging the signal in moderately heavy seas will not cause it to become inoperable.

TABLE 160.057-4(c)(1)—*Accept and reject criteria for operational test lots.*

Lot size	Individual sample size	Sample	Cumulative sample size	Accept [1]	Reject [1]
150 or less	2	First	2	(2)	200
		Second	4	(2)	200
		Third	6	0	200
		Fourth	8	0	300
		Fifth	10	100	300
		Sixth	12	100	300
		Seventh	14	299	300
151 to 500	3	First	3	(2)	200
		Second	6	0	300
		Third	9	0	300
		Fourth	12	100	400
		Fifth	15	200	400
		Sixth	18	300	500
		Seventh	21	499	500

TABLE 160.057-4(C)(1).—*Accept and reject criteria for operational test lots.*—Continued

Lot size	Individual sample size	Sample	Cumulative sample size	Accept [1]	Reject [1]
More than 501....	5	First	5	([2])	300
		Second..	10	0	300
		Third	15	100	400
		Fourth....	20	200	500
		Fifth	25	300	600
		Sixth	30	400	600
		Seventh.	35	699	700

[1] Cumulative failure percent.

[2] Lot may not be accepted. Next sample must be tested.

TABLE 160.057-4(C)(2)

Kind of defects	Percentage of failures
a. Failure to ignite	100
b. Ignites or burns dangerously........	100
c. Nonuniform smoke emitting rate	50
d. Smoke-emitting time less than 70 percent of specified time	100
e. Smoke-emitting time at least 70 percent but less than 80 percent of specified time........	75
f. Smoke-emitting time at least 80 percent but less than 90 percent of specified time........	50
g. Smoke-emitting time at least 90 percent but less than 100 percent of specified time........	25

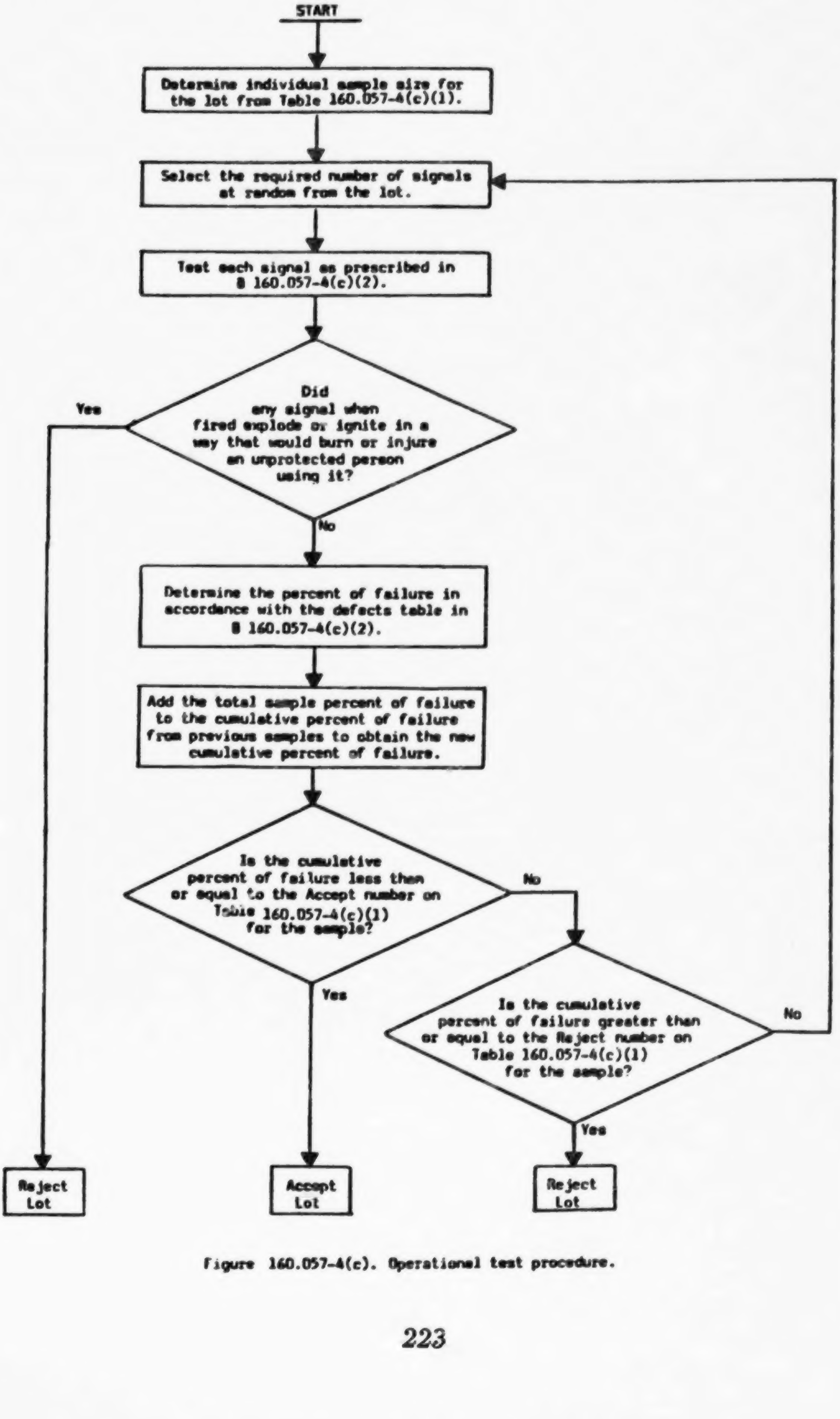

START
Determine individual sample size for the lot from Table 160.057-4(c)(1).
Select the required number of signals at random from the lot.
Test each signal as prescribed in § 160.057-4(c)(2).
Did any signal when fired explode or ignite in a way that would burn or injure an unprotected person using it?
Yes
No
Determine the percent of failure in accordance with the defects table in § 160.057-4(c)(2).
Add the total sample percent of failure to the cumulative percent of failure from previous samples to obtain the new cumulative percent of failure.
Is the cumulative percent of failure less than or equal to the Accept number on Table 160.057-4(c)(1) for the sample?
No
Yes
Is the cumulative percent of failure greater than or equal to the Reject number on Table 160.057-4(c)(1) for the sample?
No
Yes
Reject Lot
Accept Lot
Reject Lot

Figure 160.057-4(c). Operational test procedure.

(d) *Technical tests.* One signal must be subjected to each of the following tests. Each signal must pass the test in order for the lot of signals to be accepted.

(1) *Drop test.* One signal must be attached to a ring life buoy and arranged to be ignited by the dropping buoy in the same manner as it would be when used on a vessel. The signal and buoy must be mounted at least 27 m (90 ft.) above the surface of a body of water. The buoy is released and must cause the signal to ignite and fall to the water with the buoy. The signal must remain afloat and emit smoke at least 15 minutes.

(2) *Wave test.* A signal shall be tested in a manner simulating its use at sea. The signal shall be ignited and thrown overboard under conditions where waves are at least 30 cm (1 ft.) high. The smoke emitting time must be for the full 15 minutes and the signal shall float in such a manner that it shall function properly during this test. The signal shall be attached to a ring life buoy in accordance with the manufacturer's instructions.

(3) *Underwater smoke emission.* Condition the signal in accordance with paragraph (c)(2)(i) of this section. Ignite specimen and let it burn about 15 seconds in air. Submerge the burning signal in water in a vertical position with head down. Obtain underwater smoke emission time by stop watch measurements from time of submersion until smoke emission ceases. The test specimen shall emit smoke under water not less than 30 seconds when subjected to this test.

(4) *Elevated Temperature, Humidity and Storage.* Place specimen in a thermostatically controlled even-temperature oven held at 75°C. with not less than 90 percent relative humidity for 72 hours. Remove specimen and store at room temperature (20° to 25°C.) with approximately 65 percent relative humidity for 10 days. If for any reason it is not possible to operate the oven continuously for the 72-hour period, it may be operated at the required temperature and humidity for 8 hours out of each 24 during the 72-hour conditioning period. (Total of 24 hours on and 48 hours off.) The signal shall not ignite or decompose during this conditioning. The signal shall ignite and operate satisfactorily following this conditioning.

(5) *Spontaneous ignition.* Place the specimen in a thermostatically controlled even-temperature oven held at 75°C. with not more than 10% relative humidity for 48 consecutive hours. The signal must not ignite or undergo marked decomposition.

(6) *Susceptibility to explosion.* Remove smoke composition from signal and punch a small hole in the composition. Insert a No. 6 commercial blasting cap. Ignite the cap. The test specimen shall not explode or ignite.

(7) *Corrosion resistance.* Expose the complete specimen with cover secured hand-tight to a finely divided spray of 20 percent by weight sodium chloride solution at a temperature between 32°C and 38°C (90°F and 100°F) for 100 hours. The container and cap must not be corroded in any fashion that would impair their proper functioning.

(8) *Color of smoke.* Ignite specimen in the open air in daytime according to the directions printed on the signal, and determine the smoke color by direct visual comparison of the unshadowed portions of the smoke with a color chart held so as to receive the same daylight illumination as the unshadowed portions of the smoke. The color of the smoke must be orange as defined by Sections 13 and 14 of the "Color Names Dictionary" (colors 34-39 and 48-54).

(9) *Volume and density of smoke.* The test specimen shall show less than 70 percent transmission for not less than 12 minutes when measured with apparatus having a light path of 19 cm (7½ in.), an optical system aperture of +3.7 degrees, and an entrance air flow of 18.4m ^{3} per minute (650 cu. ft. per minute), such apparatus to be as described in National Bureau of Standards Report No. 4792.

§ 160.057-5 Marking.

(a) *Directions for use.* Each floating orange smoke distress signal shall be plainly and indelibly marked in black lettering not less than 3 mm (⅛ in.) high "Approved for daytime use only", and in black lettering not less than 5 mm (3/16 in.) high with the word "Directions". Immediately below shall be similarly marked in black lettering not less than 3 mm (⅛ in.) high in numbered paragraphs, and in simple and easily understood wording, instructions to be followed to make the device operative. Pasted-on labels are not acceptable.

(b) *Other markings.* (1) There shall be embossed or die-stamped, in the outer container in figures not less than 5 mm (3/16 in.) high, numbers, indicating the month and year of manufacture, thus: "6-54" indicating June 1954. The outer container shall also be plainly and indelibly marked with the commercial designation of the signal, the words "Floating Orange Smoke Distress Signal (15 minutes)", name and address of the manufacturer, the Coast Guard Approval No., the service life expiration date (month and year to be entered by the manufacturer), the month and year of manufacture and the lot number.

(2) In addition to any other marking placed on the smallest packing carton or box containing floating orange smoke distress signals, such cartons or boxes shall be plainly and indelibly marked to show the service life expiration date, the month and year of manufacture, and the lot number.

(3) The largest carton or box in which the manufacturer ships signals must be marked with the following or equivalent words: "Keep under cover in a dry place."

(c) *Marking of expiration date.* The expiration date must be not more than 42 months from the date of manufacture.

NOTE: Compliance with the labeling requirements of this section does not relieve the manufacturer of the responsibility of complying with the label requirements of 15 USC 1263, the Federal Hazardous Substances Act.

§ 160.057-7 Procedure for approval.

(a) Signals are approved by the Coast Guard under the procedures in Subpart 159.005 of this Chapter.

§ 160.057-9 Recognized independent laboratories.

(a) The following independent laboratories have been accepted by the Commandant for conducting the approval and production tests required in this Subpart:

(b) Revised copies of this list may be obtained from Commandant (G-MMT-3/TP12), U.S. Coast Guard Headquarters, Washington, D.C. 20593.

(46 USC 481, 49 USC 1655(b)(1), 49 CFR 1.46(b))

Subpart 160.058—Desalter Kits, Sea Water, for Merchant Vessels

AUTHORITY: R.S. 4417a, as amended, 4426, as amended, 4488, as amended, 4491, as amended, sec. 10, 35 Stat. 428, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, sec. 3, 54 Stat. 347, as amended, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 404, 481, 489, 395, 367, 1333, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-20, June 18, 1956, 21 FR 4894; 167-38, Oct. 26, 1959, 24 FR 8857.

SOURCE: CGFR 65-9, 30 FR 11483, Sept. 8, 1965, unless otherwise noted.

§ 160.058-1 Applicable specification.

(a) *Specification.* The following specification, of the issue in effect on the date the desalter kits are manufactured, forms a part of this subpart:

(1) *Military specification.* MIL-D-5531D—Desalter Kit, Sea Water, Mark 2.

(b) *Copies on file.* A copy of the specification referred to in this section shall be kept on file by the manufacturer, together with the approved plans and certificate of approval. The Military Specification may be obtained from the Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, Pa., 19120.

§ 160.058-2 Type.

(a) Desalter kits specified by this subpart shall be of the type described in the specification listed in § 160.058-1(a)(1).

§ 160.058-3 Materials, workmanship, construction and performance requirements.

(a) The materials, construction, workmanship, general and detail requirements shall conform to the requirements of the specification listed in § 160.058-1(a)(1), except as otherwise specifically provided by this subpart.

§ 160.058-4 Inspections.

(a) Desalter kits specified by this subpart are not inspected at regularly scheduled factory inspections; however, the Commander of the Coast Guard District in which the desalter kits are manufactured may detail a marine inspector at any time to visit places where desalter kits are manufactured to check materials and construction methods and to satisfy himself that the desalter kits are being manufactured in compliance with the requirements of the specification listed in § 160.058-1(a)(1) as modified by this specification and are suitable for the intended purpose. The manufacturer shall admit the marine inspector to his plant and shall provide a suitable place and the necessary apparatus for the use of the marine inspector in conducting tests at the place of manufacture.

§ 160.058-5 Labeling and marking.

(a) In addition to the marking and instructions required by the specification listed in § 160.058-1(a)(1), the Coast Guard approval number shall be included. The contract number may be omitted.

§ 160.058-6 Procedure for approval.

(a) *General.* Desalter kits for use in lifeboats or liferafts on merchant vessels are approved only by the Commandant, U.S. Coast Guard, Washington, D.C., 20226. Correspondence pertaining to the subject matter of this specification shall be addressed to the Commander of the Coast Guard District in which the factory is located.

(b) *Manufacturer's plans and specifications.* In order to obtain approval, submit two samples and four copies of detailed plans, specifications and a bill of material to the Commander of the Coast Guard District in which the kits are manufactured. Prior to any action by the Coast Guard it will be required that the desalter kit under consideration, either be listed on the Qualified Products List of Products Qualified Under the Military Specification listed in § 160.058-1(a)(1), or the manufacturer of such kits shall prove by report from the Bureau of Ships, U.S. Navy, or a recognized testing laboratory that the desalter kit does in fact comply with the specification listed in § 160.058-1(a)(1).

Subpart 160.060—Specification for a Buoyant Vest, Unicellular Polyethylene Foam, Adult and Child

AUTHORITY: Secs. 6 and 17, 54 Stat. 164, as amended, 166, as amended; 46 U.S.C. 526e, 526p. Treasury Department Order 120, July 31, 1950, 15 FR 6521.

SOURCE: CGFR 65-37, 30 FR 11590, Sept. 10, 1965, unless otherwise noted.

§ 160.060-1 Incorporation by reference.

(a) *Specifications and Standards.* This subpart makes reference to the following documents:

(1) [Reserved]

(2) Military Specification:

MIL-W-530F-Webbing, Textile, Cotton, General Purpose, Natural or in Colors.

(3) Federal Standards:

No. 191-Textile Test Methods.
No. 751A-Stitches, Seams, and Stitchings.

(4) Coast Guard Specification:

164.013—Foam, Unicellular Polyethylene (Buoyant, Slab, Slitted Trigonal Pattern)

(b) *Plans.* The following plans, of the issue in effect on the date buoyant vests are manufacture, form a part of this subpart:

Dwg. No. 160.060-1:
Sheet 1—Cutting Pattern and General Arrangement, Model AY.
Sheet 2—Cutting Pattern and General Arrangement, Model CYM.
Sheet 3—Cutting Pattern and General Arrangement, Model CYS.
Sheet 4—Insert Pattern, Model AY.
Sheet 5—Insert Pattern, Model CYM.
Sheet 6—Insert Pattern, Model CYS.

(c) *Copies on file.* Copies of the specifications and plans referred to in this section shall be kept on file by the manufacturer together with the Certificate of Approval.

(1) The Coast Guard plans and specifications may be obtained upon request from the Coast Guard (MMT), Room 8301, 400 Seventh Street SW., Washington, DC 20590 or a recognized laboratory listed in § 160.060-8b.

(2) The Federal Specifications and Standard may be purchased from the Business Service Center, General Services Administration, Washington, D.C., 20407.

(3) The Military Specification may be obtained from the Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, Pa., 19120.

[CGFR 65-37, 30 FR 11590, Sept. 10, 1965, as amended by CGD 72-90R, 37 FR 10839, May 31, 1972; CGD 78-012, 43 FR 27153, 27154, June 22, 1978]

§ 160.060-2 Type and model.

Each buoyant vest specified in this subpart is a:

(a) Standard:

(1) Model AY, adult (for persons weighing over 90 pounds); or

(2) Model CYM, child, medium (for children weighing from 50 to 90 pounds); or

(3) Model CYS, child, small (for children weighing less than 50 pounds); or

(b) Nonstandard:

(1) Model,[1] adult (for persons weighing over 90 pounds);

(2) Model,[1] child, medium (for persons weighing from 50 to 90 pounds) or

(3) Model,[1] child, small (for persons weighing less than 50 pounds).

[CGD 72-163R, 38 FR 8122, Mar. 28, 1973]

§ 160.060-3 Materials—standard vests.

(a) *General.* All materials used in the construction of buoyant vests shall be obtained from a supplier who furnishes an affidavit certifying that the material meets the requirements of the applicable reference specifications. The requirements for materials specified in this section are minimum requirements, and consideration will be given to the use of alternate materials in lieu of those specified. Detailed technical data and samples of all proposed alternate materials shall be submitted for approval prior to being incorporated in the finished product.

(b) *Unicellular polyethylene foam.* The unicellular polyethylene foam shall be all new material complying with specification Subpart 164.013 of this subchapter.

(c) *Envelope.* The buoyant vest envelope, or cover, shall be made from 39", 2.85 cotton jeans cloth, with a thread count of approximately 96 × 64. The finished goods shall weigh not less than 4.2 ounces per square yard, shall have thread count of not less than 94 × 60, and shall have a breaking strength of not less than 85 pounds in the warp and 50 pounds in the filling. Other cotton fabrics having a weight and breaking strength not less than the above will be acceptable. There are no restrictions as to color, but the fastness of the color to laundering, water, crocking, and light shall be rated "good" when tested in accordance with Federal Test Method Standard No. 191, Methods 5610, 5630, 5650, and 5660.

(d) *Tie tapes and body strap loops.* The tie tapes and body strap loops for both adult and child sizes must be ¾-inch cotton webbing meeting the requirements of military specification MIL-T-43566 (Class I) for Type I webbing.

(d-1) *Body straps.* The complete body strap assembly including hardware, must have a minimum breaking strength of 150 pounds for an adult size and 115 pounds for a child size. The specifications for the webbing are as follows:

(1) For an adult size vest, the webbing must be 1 inch.

(2) For a child size vest, the webbing must be three-quarter inch and meet military specification MIL-W-530 for Type IIa webbing.

(e) [Reserved]

(f) *Thread.* Each thread, except a thread of a grab strap, must meet the requirements for the specified type, class, and size of a Federal Specification listed in Table 160.001-2(j) or be a thread of equivalent size and strength that is accepted by the Commandant (G-MMT-3). Each cotton thread must be treated with mildew inhibitor that is accepted by the Commandant (G-MMT-3). Only one kind of thread may be used in each seam.

[CGFR 65-37, 30 FR 11590, Sept. 10, 1965, as amended by CGD 72-90R, 37 FR 10839, May 31, 1972; CGD 72-163R, 38 FR 8122,

---

[1] A model designation for a nonstandard vest is to be assigned by the individual manufactured and must be different from any standard vest.

Mar. 28, 1973; CGD 73-130R, 39 FR 20684, June 13, 1974; CGD 78-012, 43 FR 27154, June 22, 1978]

§ 160.060-3a Materials—Dee ring and snap hook assemblies and other instruments of closure for buoyant vests.

(a) *Specifications.* Dee ring and snap hook assemblies and other instruments of closure for buoyant vests may have decorative platings in any thickness and must meet the following specifications:

(1) The device must be constructed of inherently corrosion resistant materials. As used in this section the term "inherently corrosion resistant materials" includes, but is not limited to, brass, bronze, and stainless steel.

(2) The size of the opening of the device must be consistent with the webbing which will pass through the opening.

(b) *Testing requirements.* Dee ring and snap hook assemblies and other instruments of closure for buoyant vests must—

(1) Be tested for weathering. The Coast Guard will determine which one or more of the following tests will be used:

(i) Application of a 20 percent sodium-chloride solution spray at a temperature of 95° F (35° C) for a period of 240 hours in accordance with the procedures contained in method 811 of the Federal Test Method Standard No. 151.

(ii) Exposure to a carbon-arc weatherometer for a period of 100 hours.

(iii) Submergence for a period of 100 hours in each of the following:

(*a*) Leaded gasoline.

(*b*) Gum turpentine.

(iv) Exposure to a temperature of 0°±5° F (17.6±2.775° C) for 24 hours; and

(2) Within 5 minutes of completion of the weathering test required by paragraph (b)(1) of this section, the assembly must be attached to a support and bear 150 pounds for an adult size and 115 pounds for a child size for 10 minutes at ambient temperatures without breaking or distorting.

[CGD 73-130R, 39 FR 20684, June 13, 1974]

§ 160.060-4 Materials—nonstandard vests.

(a) *General.* All materials used in nonstandard buoyant vests must be equivalent to those specified in § 160.060-3 and be obtained from a supplier who furnishes an affidavit in accordance with the requirements in § 160.060-3(a).

(b) *Reinforcing tape.* When used, the reinforcing tape around the neck shall be ¾" cotton tape weighing not less than 0.18 ounce per linear yard having a minimum breaking strength of not less than 120 pounds.

[CGFR 65-37, 30 FR 11590, Sept. 10, 1965, as amended by CGD 72-163R, 38 FR 8122, Mar. 28, 1973]

§ 160.060-5 Construction—standard vests.

(a) *General.* This specification covers buoyant vests which essentially consist of a fabric envelope in which are enclosed inserts of buoyant material arranged and distributed so as to provide the flotation characteristics and buoyancy required to hold the wearer in an upright or slightly backward position with head and face out of water. The buoyant vests are also fitted with straps and hardware to provide for proper adjustment and close and comfortable fit to the bodies of various size wearers.

(b) *Envelope.* The envelope or cover shall be made of three pieces. Two pieces of fabric shall be cut to the pattern shown on Dwg. No. 160.060-1, Sheet 1 for the adult size, and Sheets 2 and 3 for child sizes, and joined together with a third piece which forms a 2¼" finished gusset strip all around. Reinforcing strips of the same material as the envelope shall be stitched to the inside of the front piece of the envelope in way of the strap attachments as shown by the drawings.

(c) *Buoyant inserts.* The unicellular plastic foam buoyant inserts shall be cut and formed as shown on Dwg. No. 160.060-1, Sheets 4, 5, and 6 for the adult, child medium, and child small sizes, respectively.

(d) *Tie tapes, body straps, and hardware.* The tie tapes, body straps, and hardware shall be arranged as shown on the drawings and attached to the envelope with the seams and stitching indicated.

(e) *Stitching.* All stitching shall be short lock stitch conforming to Stitch Type 301 of Federal Standard No. 751, and there shall be not less than 7 nor more than 9 stitches to the inch.

(f) *Workmanship.* Buoyant vests shall be of first-class workmanship and shall be free from any defects materially affecting their appearance or serviceability.

[CGFR 65-37, 30 FR 11590, Sept. 10, 1965, as amended by CGD 72-163R, 38 FR 8122, Mar. 28, 1973]

§ 160.060-6 Construction—nonstandard vests.

(a) *General.* The construction methods used for a nonstandard buoyant vest must be equivalent to the requirements in § 160.060-5 for standard vests and also meet the requirements specified in this section.

(b) *Sizes.* Each nonstandard vest must contain the following volume of unicellular polyethylene foam buoyant material, determined by the displacement method:

(1) Five hundred cubic inches or more for the adult size, for persons weighing over 90 pounds.

(2) Three hundred and fifty cubic inches or more for a child medium size, for children weighing from 50 to 90 pounds.

(3) Two hundred and twenty-five cubic inches or more for children weighing less than 50 pounds.

(c) *Arrangement of buoyant material.* The buoyant material in a nonstandard vest must:

(1) Be arranged to hold the wearer in an upright or backward position with head and face out of water;

(2) Have no tendency to turn the wearer face downward in the water; and

(3) Be arranged so that 70 to 75 percent of the total is located in the front of the vest.

(d) *Neck opening.* Each cloth covered nonstandard vest must have at the neck opening:

(1) A gusset; or

(2) Reinforcing tape.

(e) *Adjustment, fit, and donning.* Each nonstandard vest must be made with adjustments to:

(1) Fit a range of wearers for the type designed; and

(2) Facilitate donning time for an uninitiated person.

[CGD 72-163R, 38 FR 8122, Mar. 28, 1973]

§ 160.060-7 Inspections and tests—standard and nonstandard vests.[1]

(a) *General.* Manufacturers of listed and labeled buoyant vests shall—

(1) Maintain quality control of the materials used, the manufacturing methods, and the finished product to meet the applicable requirements of this subpart by conducting sufficient inspections and tests of representative samples and components produced;

(2) Make available to the recognized laboratory inspector and the Coast Guard inspector, upon request, records of tests conducted by the manufacturer and records of materials used during production of the device, including affidavits by suppliers; and

(3) Permit any examination, inspection and test required by the recognized laboratory or the Coast Guard for a produced listed and labeled device, either at the place of manufacture or some other location.

(b) *Lot size and sampling.* (1) A lot shall consist of 500 buoyant vests or fewer;

(2) A new lot begins after any change or modification in materials used or manufacturing methods employed;

(3) The manufacturer of the buoyant vests shall notify the recognized laboratory when a lot is ready for inspection;

(4) The manufacturer shall select samples in accordance with the requirements in Table 160.060-7(b)(4) from each lot of buoyant vests to be tested for buoyancy in accordance with paragraph (e) of this section.

---

[1] The manufacturer of a personal flotation device must meet 33 CFR 181.701 through 33 CFR 181.705 which require an instruction pamphlet for each device that is sold or offered for sale for use on recreational boats.

TABLE 160.060-7(b)(4)—SAMPLE FOR BUOYANCY TESTS

Lot size	Number of vests in sample
100 and under	1
101 to 200	2
201 to 300	3
301 to 500	4

(5) If a sample vest fails the buoyancy test, the sample from the next succeeding lot must consist of 10 specimen vests or more to be tested for buoyancy in accordance with paragraph (e) of this section.

(c) *Additional compliance tests.* An inspector from the recognized laboratory or Coast Guard may conduct an examination, test and inspection of a buoyant device that is obtained from the manufacturer or through commercial channels to determine the suitability of the device for listing and labeling, or to determine its conformance to applicable requirements.

(d) *Test facilities.* The manufacturer shall admit the laboratory inspector and the Coast Guard inspector to any part of the premises at the place of manufacture of a listed and labeled device to—

(1) Examine, inspect, or test a sample of a part or a material that is included in the construction of the device; and

(2) Conduct any examination, inspection, or test in a suitable place and with appropriate apparatus provided by the manufacturer.

(e) *Buoyancy*—(1) *Buoyancy test method.* Remove the buoyant inserts from the vests. Securely attach the spring scale in a position directly over the test tank. Suspend the weighted wire basket from the scale in such a manner that the basket can be weighed while it is completely under water. In order to measure the actual buoyancy provided by the inserts, the underwater weight of the empty basket should exceed the buoyancy of the inserts. To obtain the buoyancy of the inserts, proceed as follows:

(i) Weigh the empty wire basket under water.

(ii) Place the inserts inside the basket and submerge it so that the top of the basket is at least 2 inches below the surface of the water. Allow the inserts to remain submerged for 24 hours. The tank shall be locked or sealed during this 24-hour submergence period. It is important that after the inserts have once been submerged they shall remain submerged for the duration of the test, and at no time during the course of the test shall they be removed from the tank or otherwise exposed to air.

(iii) After the 24-hour submergence period, unlock or unseal the tank and weigh the wire basket with the inserts inside while both are still under water.

(iv) The buoyancy is computed as paragraph (e)(1)(i) of this section minus paragraph (e)(1)(iii) of this section.

(2) *Buoyancy required.* The buoyant inserts from adult size buoyant vests shall provide not less than 15½ pounds of buoyancy in fresh water; the inserts from the child medium size buoyant vests shall provide not less than 11 pounds buoyancy; and the inserts from the child small size buoyant vests shall provide not less than 7 pounds buoyancy.

(f) *Body strap test.* The complete body strap assembly, including hardware shall be tested for strength by attaching the dee ring to a suitable support such that the assembly hangs vertically its full length. A weight as specified in § 160.060-3(d) shall be attached to the other end on the snap hook for 10 minutes. The specified weight shall not break or excessively distort the body strap assembly.

(g) *Additional approval tests for nonstandard vests.* Tests in addition to those required by this section may be conducted by the inspector for a nonstandard vest to determine performance equivalence to a standard vest. Such additional tests may include determining performance in water, suitability of materials, donning time, ease of adjustment, and similar equivalency tests. Costs for any additional tests must be assumed by the manufacturer.

[CGFR 65-37, 30 FR 11590, Sept. 10, 1965, as amended by CGD 72-90R, 37 FR 10839, May 31, 1972; CGD 72-163R, 38 FR 8122, Mar. 28, 1973; CGD 75-008, 43 FR 9772, Mar. 9, 1978]

§ 160.060–8 Marking.

(a) Each buoyant vest must have the following information clearly marked in waterproof lettering:

Type II Personal Flotation Device.
Inspected and tested in accordance with U.S. Coast Guard regulations.
Polyethylene foam buoyant material provides a minimum buoyant force of (15½ lb., 11 lb., or 7 lb.).
Dry out thoroughly when wet.
Approved for use on all recreational boats and on uninspected commercial vessels less than 40 feet in length not carrying passengers for hire by persons weighing (more than 90 lb., 50 to 90 lb., or less than 50 lb.).
U.S. Coast Guard Approval No. 160.060/(assigned manufacturer's No.)/(Revision No.); (Model No.).
(Name and address of manufacturer or distributor).
(Lot No.).

(b) *Waterproof marking.* Marking of buoyant vests shall be sufficiently waterproof so that after 72 hours submergence in water it will withstand vigorous rubbing by hand while wet without printed matter becoming illegible.

[CGD 72-163R, 38 FR 8122, Mar. 28, 1973, as amended by CGD 75-008, 43 FR 9771, Mar. 9, 1978]

§ 160.060–8a Recognized laboratory.

To be designated a recognized laboratory, the laboratory must be—

(a) Operated as a nonprofit public service;

(b) Engaged regularly in the examination, testing, and evaluation of safety of materials, installations, and devices for marine use; and

(c) Established in factory inspection, listing and labeling by having an existing program and standards for evaluating, listing and labeling buoyant vests that are acceptable to the Commandant.

[CGD 72-90R, 37 FR 10839, May 31, 1972]

§ 160.060–8b Designated recognized laboratory.

Underwriter's Laboratories, Inc., Marine Department, Tampa East Industrial Park, 2602 Tampa East Boulevard, Tampa, FL 33619 is a recognized laboratory.

[CGD 72-90R, 37 FR 10839, May 31, 1972]

§ 160.060–8c Compliance label.

If a recognized laboratory approves a buoyant vest, the device is allowed to carry the label of the recognized laboratory.

[CGD 72-90R, 37 FR 10839, May 31, 1972]

§ 160.060–9 Procedure for listing and labeling.

(a) A recognized laboratory must inform each manufacturer that requests listing and labeling of a buoyant vest for use on a vessel of Class A, 1, or 2 not carrying passengers for hire, of the procedures for—

(1) Inspection;

(2) Examination;

(3) Tests; and

(4) The forwarding to the Coast Guard of the test report and the description of the quality control program of the requesting manufacturer.

(b) The cost of any examination, test, and inspection, and the cost of listing and labeling must—

(1) Be paid by the manufacturer; and

(2) Be the same for similar services for each manufacturer.

(c) The Coast Guard reviews each test report and quality control procedure forwarded by the recognized laboratory to determine if the approval requirements have been met. After the review is completed, the Coast Guard—

(1) Notifies the laboratory that the device is approved or disapproved and, if approved, listed and labeled; and

(2) Publishes notice of the approval in the FEDERAL REGISTER and Coast Guard publication CG-190.

(d) The Commandant, U.S. Coast Guard, determines all matters concerning approval requirements. The manufacturer or recognized laboratory may at any time request advice from the Commandant.

[CGD 72-90R, 37 FR 10839, May 31, 1972]

§ 160.060–11 Termination of listing and labeling.

(a) The approval for listing and labeling as a Coast Guard approved buoyant vest may be terminated, withdrawn, cancelled, or suspended by—

(1) Written notice to the recognized laboratory from the Commandant; or

(2) Written notice to the manufacturer from the recognized laboratory or the Commandant.

(b) Termination of the listing and labeling as a buoyant vest may occur if—

(1) The manufacturer does not want to retain the service;

(2) The listed device is no longer manufactured;

(3) The manufacturer's program does not provide continued assurance of the quality of the listed and labeled device;

(4) The device no longer conforms to current applicable requirements of the Coast Guard and the recognized laboratory; or

(5) The Coast Guard determines from the use of the device by the public or through other information that it is incapable of performing as a lifesaving device under the requirements of this subpart.

[CGD 72-90R, 37 FR 10840, May 31, 1972]

§ 160.060-12 Penalties.

A manufacturer that violates any of the approval requirements for listing and labeling but continues to mark the device as being U.S. Coast Guard approved is subject to the penalties contained in 14 U.S.C. 639.

[CGD 72-90R, 37 FR 10840, May 31, 1972]

Subpart 160.061—Fishing Tackle Kits, Emergency, for Merchant Vessels

AUTHORITY: R.S. 4417a, as amended, 4426, as amended, 4488, as amended, 4491, as amended, sec. 10, 35 Stat. 428, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, sec. 3, 54 Stat. 347, as amended, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 404, 481, 489, 395, 367, 1333, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-20, June 18, 1956, 21 FR 4894; CGFR 56-28, July 24, 1956, 21 FR 5659; 167-38, Oct. 26, 1959, 24 FR 8857.

SOURCE: CGFR 65-9, 30 FR 11483, Sept. 8, 1965, unless otherwise noted.

§ 160.061-1 Applicable specifications.

(a) The following specifications, of the issue in effect on the date emergency fishing tackle kits are manufactured, form a part of this subpart:

(1) Federal specifications:

QQ-I-706—Iron and steel; sheet, tinned (tin plate).
QQ-W-423—Wire, steel, corrosion-resisting
HH-P-91—Packing, fiber, hard sheet.
CCC-F-451—Flannel, canton.

(2) Military specifications:

MIL-H-2846—Hooks, fish, steel.
MIL-B-1418—Blades, razor, safety.
MIL-A-140—Adhesive, water-resistant, W.P. barrier-material.

(b) Copies of the specifications referred to in this section shall be kept on file by the manufacturer, together with the approved plans, if any, and the certificate of approval.

(1) The Federal Specifications may be purchased from the Business Service Center, General Services Administration, Washington, D.C. 20407.

(2) The Military Specifications may be obtained from the Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, Pa. 19120.

§ 160.061-2 Requirements.

(a) *Material.* Material shall be as specified in this subpart.

(b) *Assembly.* Emergency fishing kits shall consist of fishing rigs, accessories, and instructions furnished in a hermetically sealed container.

(c) *Components.* Each fishing kit shall consist of the items listed in table 160.06-2(c).

TABLE 160.061-2(c)—FISHING KITS

Item No.	Description [1]	Quantity
1	Booklet, Fishing Instructions (Refer to § 160.061-3(i)).	1 ea.
2	Container, Fishing Kit (See Fig. 2)	1 ea.
3	Hooks, treble, size 1, short shank	2 ea.
4	Hooks, size 7/0, 5/0, 1/0, 2, 6, 8, O'Shaugnessy, straight shank, double strength.	2 ea.
5	Leader, wire, 0.011-inch diameter, 27-pound test (with No. 3 snap on one end and No. 7 swivel on the other end) 6-inch length.	2 ea.
6	Leader, wire, 0.016-inch diameter, 58-pound test (with No. 3 snap on one end and No. 4 swivel on the other end) 12-inch length.	2 ea.
7	Leader, monofilament, 0.021-inch diameter, 15-pound test, 4-foot length.	4 ea.
8	Line, monofilament, 18-pound test, 100-foot length.	1 ea.
9	Line, nylon or dacron, braided, 63-pound test, 150 feet length.	1 ea.
10	Pad, canton flannel, 2¾ inches square, specification CCC-F-451, color, bright yellow.	1 ea.
11	Pad, canton flannel, 2¾ inches square, specification CCC-F-451, color, bright red.	1 ea.
12	Lure, spoon, removable No. 6 hook, yellow feathers, blade length $1\frac{3}{32}$ inches, width $\frac{15}{32}$ inch, weight $\frac{1}{20}$ ounce, polished copper finish.	1 ea.
13	Lure, spoon, removable No. 5/0 hook, yellow feathers, blade length 3 inches, width ⅞ inch, weight ⅗ ounce, polished chrome finish.	1 ea.
14	Lure, spoon, free swinging No. 1 treble double strength, short shank, blade length $2\frac{3}{16}$ inches, width $\frac{13}{16}$ inch, weight ¼ ounce, stainless steel or chrome plated brass.	1 ea.
15	Sinkers, pinch on or equal, ¼ ounce, $\frac{5}{16}$ ounce, 1 ounce.	1 ea.
16	Foil, shiny, 4 inches square	1 ea.
17	Squid, tinned body, length 2 inches, weight ½ ounce.	1 ea.
18	Jig, painted lead head, bucktail feathered with 1/0 hook.	1 ea.
19	Jig, painted lead head, bucktail feathered with 3/0 hook.	1 ea.
20	Blades, razor, safety, single edge	1 ea.
21	Bait, pork rind, 4 inches long, ½ inch wide, with ends tapered to ⅛ inch wide and rounded.	4 ea.
22	Snap and swivels, No. 3	6 ea.
23	Card, leader knots and hitches (fig. 1).	1 ea.
24	Winder (see § 160.061-3(h))	2 ea.

[1] The tolerances of these items shall be plus or minus $\frac{1}{32}$-inch on all dimensions.

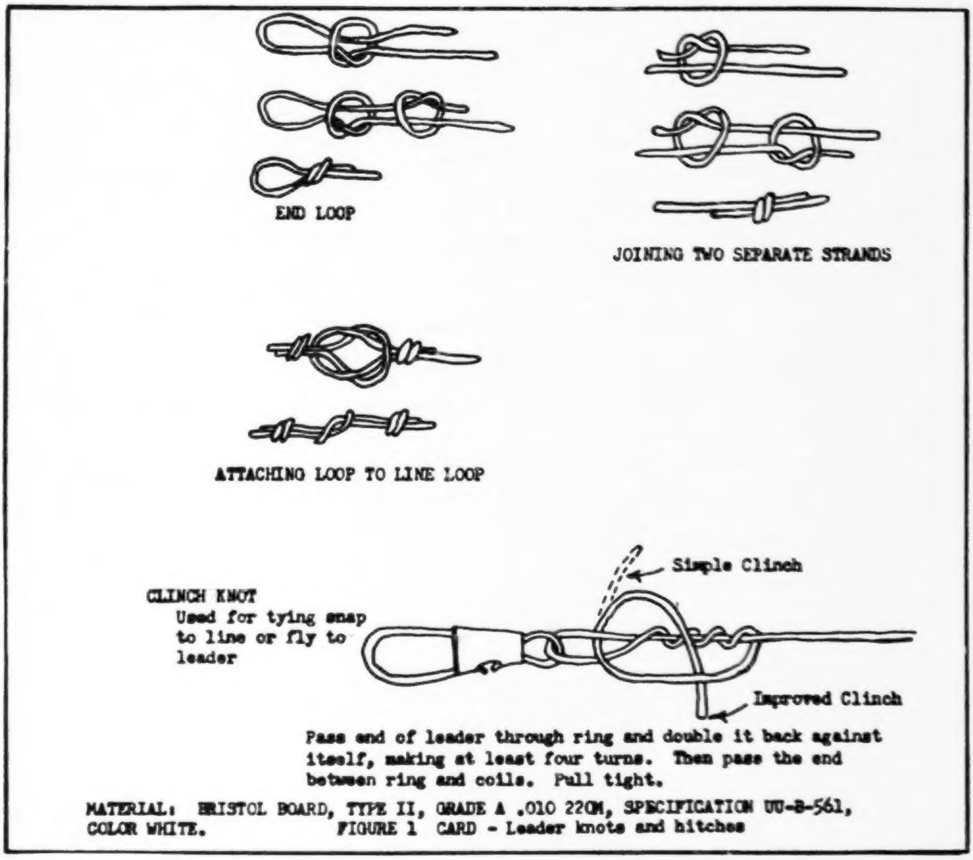
§ 160.061-3 Design and construction.

(a) *Container.* The container shall be made of ethyl cellulose, clear, type EM—1, Specification MIL-P-3412 or better. The dimensions shall not exceed those specified in Figure 2. Other packaging arrangements acceptable to the Commandant will be considered.

(b) *Card.* A card showing leader knots and hitches shall be provided as per Figure 1. Size of card should not exceed 2¾ by 4¾ inches.

(c) *Hooks.* Unless otherwise specified, all hooks shall be of forged steel, hollow ground with filed out points. The hooks shall be of ringed type and shall be tinned. Hooks shall be tempered, tough, flexible, and resilient.

(d) *Leaders.* Wire leaders shall be of stainless steel, and shall be attached to snaps and swivels with not less than six turns of wire. Monofilament leaders shall be blue mist and shall be provided with a ⅝-inch inside diameter end loop on one end.


END LOOP
JOINING TWO SEPARATE STRANDS
ATTACHING LOOP TO LINE LOOP
CLINCH KNOT
Used for tying snap to line or fly to leader
Simple Clinch
Improved Clinch

Pass end of leader through ring and double it back against itself, making at least four turns. Then pass the end between ring and coils. Pull tight.

MATERIAL: BRISTOL BOARD, TYPE II, GRADE A .010 220M, SPECIFICATION UU-B-561, COLOR WHITE. FIGURE 1 CARD - Leader knots and hitches

FIGURE 1

(e) *Snaps and swivels.* Swivels shall be either of brass or bronze. Snaps shall be stainless steel.

(f) *Lines.* Unless otherwise specified nylon lines shall be hard braided, waterproofed, and heat set to reduce "stretch". Lines may be either camouflage or mist in color.

(g) *Spoons.* Spoons shall be of the single-blade, egg-shaped dished type with either fixed or free-swinging hooks. The spoons shall be stainless steel or stamped from brass and plated to resist corrosion. Each spoon shall, on the forward end, be provided with an eye for attachment to the line. Spoons having free-swinging hooks shall have the hooks attached by means of a split ring through a hole in the rear of the blade. In fixed-hook spoons, the hook shall be attached to the spoon by a screw and shall be shaped to conform to the contour of the spoon. Feathers, if provided, shall be yellow hackle feathers attached to the hook by wrapping with thread, and the wrapping coated with red lacquer.

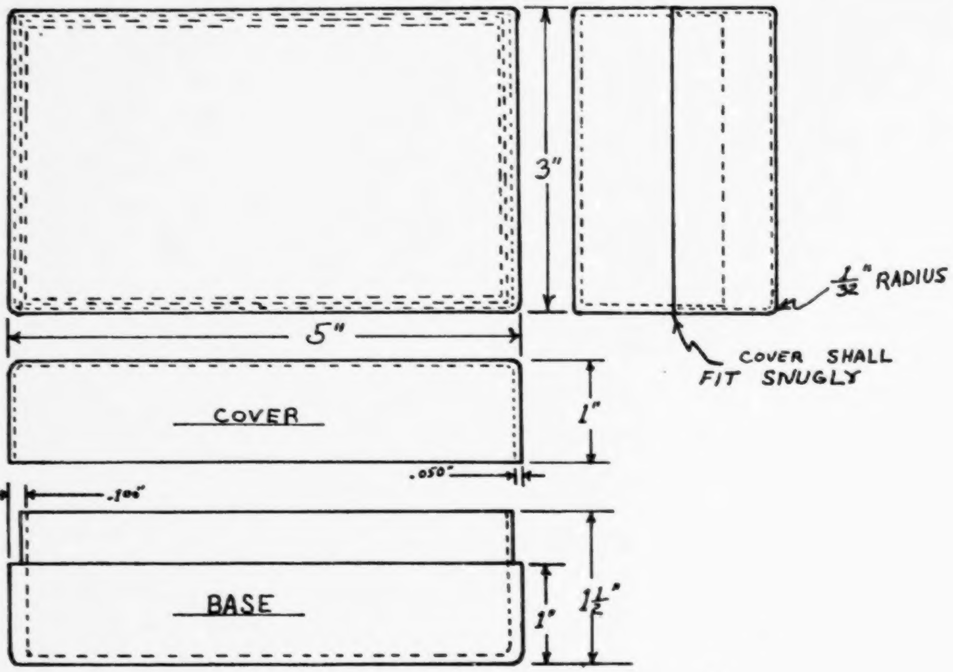


FIGURE 2

(h) *Winder.* Winders shall conform to Figure 3, or shall be of an equivalent commercial design suitable to contain required length of line.

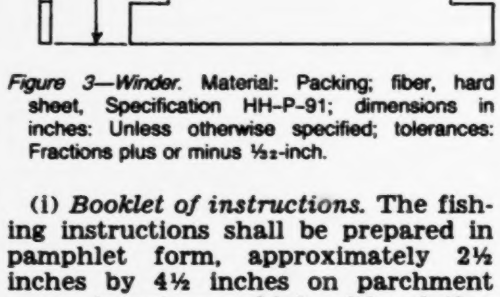


Figure 3—Winder. Material: Packing; fiber, hard sheet, Specification HH-P-91; dimensions in inches: Unless otherwise specified; tolerances: Fractions plus or minus 1/32-inch.

(i) *Booklet of instructions.* The fishing instructions shall be prepared in pamphlet form, approximately 2½ inches by 4½ inches on parchment paper, in waterproof ink, with printing on one side of the paper only. The booklet shall contain a complete description of how and under what conditions each component should be used, and general suggestions for fishing. It shall be prepared in easy to read form in such a manner that a completely inexperienced person will know what equipment to use and how to use it. Both physical form and the contents of the booklet shall be specially approved by the Commandant, U.S. Coast Guard, prior to acceptance. A copy of approved contents for the instruction booklet will be furnished on request.

§ 160.061-4 Kit assembly.

(a) *Preparation of items.* The items shall be prepared for packing into the kit as indicated below. Each transparent envelope shall be closed by heat sealing.

Item No.	*Preparation for assembly*
1, 10, 11, 12, 13, 14, 15, 16, 17, 23, 24.	None.
3, 4, 5, 6, 7, 18, 19, 21, 22.	Insert in a transparent envelope.
8 and 9	Gather into a hank 4½ inches long and restrain with tape.
20	Wrap in paper envelope.

(b) *Packing of items.* The components of the kit, after being prepared as specified, shall be packed in the container in such manner that there is a minimum possibility of any item being bent or crushed. The marking label shall be placed on the bottom of the container with the wording facing out. The instruction booklet shall be packed, front cover up, under the lid. The container shall be sealed after the components have been packaged therein with an 18-inch length of ¾-inch wide adhesive tape conforming to Specification JAN-P-127. The tape shall be applied around the perimeter of the container with an equal amount on each side of the juncture of the two sections of the container. An alternate packaging arrangement acceptable to the Commandant will be acceptable.

§ 160.061-5 Marking.

(a) *General.* The containers shall be stenciled on the bottom in black with the manufacturer's name or trademark and type or model number in letters approximately 3/16 inch high, together with the following legend in letters 3/16 inch high:

UNITED STATES COAST GUARD

APPROVAL NO. 160.061/—

EMERGENCY FISHING TACKLE KIT

OPEN ONLY

FOR ACTUAL EMERGENCY USE

NOT FOR INSPECTION

§ 160.061-6 Inspection and test.

(a) *General.* Fishing tackle kits specified by this subpart are not inspected at regularly scheduled factory inspections; however, the Commander of the Coast Guard District in which the fishing tackle kits are manufactured may detail a marine inspector at any time to visit places where fishing kits are manufactured to check materials and construction methods and to conduct such tests and examinations as may be required to satisfy himself that the fishing tackle kits are being manufactured in compliance with the requirements of this specification and are suitable for the intended purpose. The manufacturer shall admit the marine inspector to his plant and shall provide a suitable place and the necessary apparatus for the use of the inspector in conducting tests at the place of manufacture.

§ 160.061-7 Procedure for approval.

(a) *General.* Fishing kits for use in lifeboats, liferafts, etc., aboard merchant vessels are approved only by Commandant, U.S. Coast Guard, Washington, D.C., 20226. Correspondence relating to the subject matter of this specification shall be addressed to the Commander of the Coast Guard District in which the factory is located.

(b) *Pre-approval sample and plans.* Manufacturers who desire to manufacture approved fishing kits shall submit to the Commander of the Coast Guard District in which the factory is located, two sample fishing kits, together with 4 sets of drawings showing all items, instructions, markings, etc. The Commander of the Coast Guard District will forward the sample fishing kits and the drawings to the Commandant to determine compliance with this subpart and suitability of the fishing tackle kit for type approval for use in lifeboats and liferafts on merchant vessels.

Subpart 160.062—Releases. Lifesaving Equipment, Hydraulic and Manual

AUTHORITY: R.S. 448, as amended, 4491, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, sec. 3, 70 Stat. 152, sec. 3, 68 Stat. 675; 46 U.S.C. 481, 489, 367 390b, 50 U.S.C. 198, E.O. 11239; 3 CFR, 1964-1965 Comp.

SOURCE: CGFR 68-32, 33 FR 5721, Apr. 12, 1968, unless otherwise noted.

§ 160.062-1 Applicable specifications, and referenced material.

(a) *Specifications and standards.* The following specifications of the issue in effect on the date releases are manufactured or reconditioned shall form a part of the regulations of this subpart (see §§ 2.75-17 through 2.75-19 of Subchapter A (Procedures Applicable to the Public) of this chapter):

(1) Military Specifications and Standards:

MIL-R-15041C—Releases, lifesaving equipment, hydraulic and manual.

MIL-STD-105—Sample procedures and tables for inspection by attributes.

(2) Federal Test Method Standards:

Standard No. 151—Metals, test methods.

(b) *Technical references.* For guidance purposes the technical reference may be used, which is entitled "Corrosion Handbook," 1948, by H. H. Uhlig, and published by John Wiley & Sons, Inc., 605 Third Avenue, New York, N.Y. 10016, and priced at $21 per copy.

(c) *Copies on file.* A copy of the specifications and standards listed in paragraph (a) of this section shall be kept on file by the manufacturer, together with the approved plans, specifications and certificate of approval. It is the manufacturer's responsibility to have the latest issue, including addenda and changes, of these specifications and standards on hand when manufacturing or reconditioning equipment under this specification subpart.

(1) The military specifications and standards may be obtained from the Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, Pa. 19120.

(2) The Federal standards may be obtained from the Business Service Center, General Services Administration, Washington, D.C. 20407.

§ 160.062-2 Types.

(a) The hydraulic releases referred to under § 160.062-1(a)(1) are of the diaphram-spring plunger type, which releases a buoyant load under hydrostatic pressure.

(b) All hydraulic releases given an approval under this subpart shall be designed and tested to operate with spring-tensioned gripes. Such gripes shall be considered as a part of each approval.

(c) Alternate designs will be given special consideration, but the expense of their preliminary investigation at a laboratory accepted by the Commandant shall be borne by the manufacturer.

[CGFR 68-32, 33 FR 5721, Apr. 12, 1968, as amended by CGD 73-153R, 40 FR 4422, Jan. 30, 1975]

§ 160.062-3 Materials, construction, workmanship, and performance requirements.

(a) *General.* The materials, construction, workmanship, and performance requirements shall conform to the requirements of the specifications listed in § 160.062-1(a)(1) except as otherwise provided by this subpart. In addition, all metals and materials used in a hydraulic release must be compatible with each other so that the final assembly under conditions of use is not subject to such deleterious effects as galvanic corrosion, freezing, or buckling of moving parts, or loosening and tightening of joints due to differences in coefficients of thermal expansion. Galvanizing or other forms of metallic coating on the parts of a hydraulic release are not acceptable. The criteria for accepting any combination of materials shall be determined by testing or by the data stated in § 160.062-1(b).

(b) *Buoyant load capacity.* A hydraulic release working in conjunction with its spring-tensioned gripe must demonstrate that it can release buoyant loads between the limits of 200 pounds and 3,750 pounds and within the range of depths specified by paragraph (c) of this section.

(c) *Release depth.* A hydraulic release shall automatically release the buoyant loads described in paragraph (b) of this section at depths between 5 feet to 15 feet prior to being tested for either the temperature or the corrosion resistance tests of 160.062-4(c)(2). After exposure to these temperature and corrosion tests, a hydraulic release shall release the buoyant loads of paragraph (b) of this section between the depths of 5 feet to 25 feet.

§ 160.062-4 Inspections and tests.

(a) *General.* Marine inspectors shall be assigned to make factory inspections of hydraulic releases, as described in paragraph (d) of this section for sampling and testing. In addition, the Commander of the Coast Guard District may detail a marine inspector at any time to visit any place where approved hydraulic releases are manufactured or reconditioned to observe production methods and to conduct any inspections or tests which may be deemed advisable. The marine inspector shall be admitted to any place in the factory or place where work is done on hydraulic releases or their components. In addition, the marine inspector may take samples of assembled hydraulic releases or parts or materials used in their construction for further examination, inspection, or tests. The manufacturer shall provide a suitable place and the apparatus necessary for the performance of the tests which are conducted at the place of manufacture by the marine inspector.

(b) *Classification of tests.* The sampling, inspections, and tests conducted upon hydraulic releases shall fall within one of the following general classifications, as described hereafter:

(1) Preapproval tests.

(2) Factory inspections and tests.

(3) Spot check tests.

(4) Periodic servicing tests.

(c) *Preapproval testing.* The "Visual and dimensional examination" referred to in Table 160.062-4(c) shall be conducted by a marine inspector at the factory. The "Physical and operational tests" of that table shall be conducted at a laboratory accepted by the Commandant.

TABLE 160.062-4(c)—PREAPPROVAL TESTS [1]

Number of specimens	Name of tests	Reference
4	Visual and dimensional examination.	Para. 4.2.1, 4.2.2, and 4.3 of MIL-R-15041C.
4	Physical and operational tests.	Para. 4.2.1, 4.2.3, and 4.4 of MIL-R-15041C.

[1] These tests are called "Lot acceptance tests," in Military Specification MIL-R-15041C.

(1) *Visual and dimensional examination.* The marine inspector shall examine the 4 hydraulic release samples of the preapproval sample for their visual and dimensional characteristics. If all 4 of the devices are in agreement with the manufacturer's plans previously reviewed by the Commandant, the 4 devices will be accepted and are to be assembled for further testing under the "Physical and operational tests" of paragraph (c)(2) of this section.

(2) *Physical and operational tests.* Each hydraulic release selected under Table 160.062-4(c) for the "Physical and operational tests" shall undergo each of the tests described in this paragraph without renewal of parts or repairs between the tests. The tests shall be conducted in the following sequence:

(i) *Submergence test.* A hydraulic release shall be tested by applying buoyant loads of its designed capacity to its spring-tensioned gripe as required under § 160.062-3(b) while the device is submerged in water or in a water-filled pressure testing tank. A hydraulic release shall show by its submergence test that it meets the buoyant capacity and release depth requirements of § 160.062-3(b) and (c) by automatically tripping and releasing its load.

(ii) *Temperature test.* After its submergence test, a hydraulic release sample shall be placed in a cold box at minus 30 degrees F. for 4 hours. Upon completion of this conditioning, the sample device shall be opened for inspection and shall show no significant change in the position of the hydraulic or manual control as a result of the low temperature exposure.

(iii) *Corrosion resisting test.* After the completion of its temperature test, a hydraulic release sample shall be exposed to a 20 percent salt spray test for 160 continuous hours in accordance with Federal Test Method Standard No. 151. At the conclusion of this test, the sample device shall be entirely serviceable and shall show a minimal amount of corrosion.

(iv) *Second temperature test.* After its corrosion resisting test, a hydraulic release sample shall undergo a repeat of the temperature test, subdivision (ii) of this paragraph.

(v) *Second submergence test.* The final test of a hydraulic release sample shall be a repeat of the submergence test, paragraph (c)(2)(i) of this section.

(d) *Factory inspections and tests.* For purposes of sampling, a lot shall consist of not more than 500 hydraulic releases of the same model. Manufacturers of approved hydraulic releases shall maintain quality control of the materials used, manufacturing methods, workmanship, and the finished product as to produce hydraulic releases in conformity with the approvals previously issued by the Commandant.

(1) *Visual and dimensional examination.* A random sample of hydraulic releases shall be selected by a marine inspector at the factory in accordance with Table 160.062-4(d)(1) from each assembled lot. After the samples have been selected, they will undergo an examination of visual and dimensional characteristics by referring to their approved drawings with their acceptance based on Table 160.062-4(d)(1) and MIL-STD-105, and checking for compliance with specific details as described therein.

TABLE 160.062-4(d)(1)—SAMPLING FOR VISUAL AND DIMENSIONAL EXAMINATION [1]

Number of release devices in inspection lot	Number of release devices in sample	Rejection number (defectives)
15 and under	All	
16 to 25	15	1
26 to 40	25	1
41 to 110	35	2
111 to 180	50	2
181 to 300	75	3
301 to 500	110	2

[1] This table is derived from Table I of Paragraph 4.2.2 of Military Specification MIL-R-15041C.

(2) *Physical and operational tests.* If the sampling and examination of paragraph (d)(1) of this section are satisfactory, the marine inspector shall select an additional random sample of hydraulic releases from the same assembled lot as described above. This second group of samples, of a number determined by Table 160.062-4(d)(2), shall be forwarded for testing at the manufacturer's expense to a laboratory accepted by the Commandant. Each hydraulic release shall undergo each of the tests described in this paragraph without renewal of parts or repairs between tests. The tests shall be conducted in the following sequence:

(i) *Submergence test.* Same test as described in paragraph (c)(2)(i) of this section.

(ii) *Temperature test.* Same test as described in paragraph (c)(2)(ii) of this section.

(iii) *Corrosion resisting test.* Same test as described in paragraph (c)(2)(iii) of this section.

(iv) *Second temperature test.* Same test as described in paragraph (c)(2)(iv) of this section.

(v) *Second submergence test.* Same test as described in paragraph (c)(2)(v) of this section.

TABLE 160.062-4(d)(2)—SAMPLING FOR PHYSICAL AND OPERATIONAL TESTS [1]

Number of release devices in inspection lot	Number release devices in sample	Rejection number (failures in the tests)
15 and under	4	1
16 to 25	5	1
26 to 40	7	1
41 to 110	10	1
111 to 180	12	1
181 to 300	16	1
301 to 500	20	1

[1] This table is derived from Table II of Paragraph 4.2.3 of Military Specification MIL-R-15041C.

(3) *Lot acceptance at a factory.* The submergence test of paragraph (c)(2)(i) shall be performed on each of the remaining hydraulic releases in a production lot after the selection of the lot samples required by paragraph (d)(2) of this section. Such individual submergence tests may be performed at the factory in a pressure tank apparatus which simulates the hydrostatic pressure and the various tension loads on the hydraulic release. Those hydraulic releases which do not pass this submergence test shall be removed from the production lot as unacceptable, but may be reworked and included in a subsequent lot. After the completion of these individual submergence tests and after receipt of the laboratory's test report showing that the tests on the lot samples were satisfactorily met, the Commander of the Coast Guard District in which the factory is located shall have the manufacturer notified that this production lot of hydraulic releases meets the requirements of this specification subpart. After being marked as required by § 160.062-5, the manufacturer may sell such hydraulic releases as approved equipment.

(i) Hydraulic releases which have been rejected may not, unless subsequently accepted, be sold or offered for sale under representation as being in compliance with this specification or as being approved for use on vessels subject to inspection under this chapter.

(4) *Records and test reports.* The manufacturer shall maintain records and copies of test reports for each production lot of hydraulic releases manufactured for a period of five (5) years from the date notified that a production lot meets the requirements in this subpart. These records and test reports, upon request, shall be made available to the marine inspector. The manufacturer will be provided with a copy of the laboratory's test report concerning each production lot of hydraulic releases submitted for testing.

(e) *Spot checks.* As one of the conditions in granting an approval for a hydraulic release under this subpart, the Coast Guard reserves the right to spot check at any time and at any place the product, parts, and complete assemblies of hydraulic releases covered by the approval. The spot check shall be by a marine inspector who shall be admitted to the place or places where work may be performed before, during, or after the manufacture of hydraulic releases or at any place where hydraulic releases may be assembled, reworked, repaired, or reconditioned by the manufacturer of any repair facility accepted by the Commandant in accordance with the procedure contained in § 160.062-7. A spot check includes having a marine inspector compare materials, parts, and workmanship and/or complete hydraulic releases with the manufacturer's approved plans, records and test reports to ascertain compliance with these requirements. The marine inspector may select samples of materials or parts used in the construction of hydraulic releases and complete hydraulic releases and may order or have performed any or all of the tests described in this section conducted on such devices or parts thereof. This work and any tests required shall be borne by the manufacturer without cost to the Coast Guard.

(f) *Periodic Servicing and Testing.* A hydraulic release is inspected as follows:

(1) *Inspection for devices not installed after manufacture.* A hydraulic release, that is not installed after manufacture and is stored for period of 24 months or less, is not required to be inspected or tested before installation but must be stamped by a marine inspector on the inspection tag required in § 160.062-5(b)(2) with—

(i) The word "Installed";

(ii) The installation date; and

(iii) The Marine Inspection Office identification letters.

(2) *Inspection for devices that have been installed.* A hydraulic release that is installed for a period of 12 months or more must pass the test contained in paragraph (f)(3) of this section and be marked as required in paragraph (f)(5) of this section. If, after passing the test, the device is stored for a period of 24 months or less, it must be stamped as required in paragraph (f)(1) of this paragraph by the marine inspector before reinstallation.

(3) *Devices stored longer than 24 months.* A hydraulic release that is stored for a period of more than 24 months must be inspected and tested by an employee of a repair or test facility, accepted in accordance with the requirement contained in § 160.062-7 or § 160.062-8, as follows:

(i) The device must be manually operated to determine if it releases.

(ii) If the device releases, it must pass the submergence test contained in paragraph (c)(2)(i) of this section, at a depth between 5 feet and 15 feet and be marked as required in paragraph (f)(5) of this section.

(iii) If the device fails to release or fails to pass the submergence test required in paragraph (f)(3)(ii) of this section, the device must be disassembled, repaired, and tested in accordance with the requirements contained in paragraph (f)(4) of this paragraph.

(4) *Disassembly and repair tests.* If a hydraulic release fails the test contained in paragraph (f)(3)(iii) of this section, it must be disassembled and repaired by the manufacturer or a repair facility accepted in accord with the requirements contained in § 160.062-7 and be tested as follows:

(i) A production lot must be formed consisting of 12 or more but not exceeding 100 devices.

(ii) In the presence of a marine inspector, the device must pass the submergence test contained in paragraph (c)(2)(i) of this section at a depth between 5 feet and 15 feet.

(iii) Any device that fails must be—

(A) Repaired;

(B) Placed in a subsequent lot; and

(C) Submitted to the submergence test contained in paragraph (c)(2)(i) of this section at a depth between 5 feet and 15 feet.

(5) *Marking of devices.* If a hydraulic release passes the submergence test required in paragraph (c)(2)(i) of this section at a depth between 5 feet and 15 feet the marine inspector stamps the inspection tag with—

(i) The test date;

(ii) The Marine Inspection Office identification letters; and

(iii) The letters "USCG".

(46 U.S.C. 375, 416; 49 U.S.C. 1655(b); 49 CFR 1.4(b), and 1.46)

[CGFR 68-32, 33 FR 5721, Apr. 12, 1968, as amended by CGD 73-153R, 40 FR 4422, Jan. 30, 1975; CGD 75-186, 41 FR 10437, Mar. 11, 1976]

§ 160.062-5 Markings.

(a) Hydraulic releases manufactured prior to the granting of a certificate of approval to the manufacturer may be permitted in service only to July 1, 1969. However, such hydraulic releases meeting the type and design requirements covered by a current certificate of approval may be repaired and/or reconditioned as provided in § 160.062-4(f) and be accepted as approved equipment when it bears the following markings:

(1) *Body marking.* The name of the manufacturer and the model designation are plainly visible.

(2) *Inspection tag markings.* Each hydraulic release repaired or reconditioned shall be provided with a 2″ by 3½″ stainless steel tag of a minimum thickness of 0.032 inches. This tag shall be permanently attached to a hydraulic release with a single stainless steel link made of wire ³⁄₁₆″ in diameter. This link shall provide nonrigid attachment of the tag to the hydraulic release. The top of the inspection tag shall be stamped in block characters not less than ¹⁄₁₆″ in height with the manufacturer's name, Coast Guard approval number, the limits of buoyant capacity in pounds, the Marine Inspection Office identification letters, and the letters "USCG." The remaining space on the tag will be used for the stamping of periodic servicing test dates and the marine inspector's initials as described in § 160.062-4(f).

(b) Hydraulic release manufactured under a certificate of approval issued under this subpart shall be provided with 2 sets of markings as follows:

(1) *Body marking.* The metal body of a hydraulic release shall be stamped in block characters not less than ⅛″ in height on a plainly visible portion with the name of the manufacturer, the model designation, the limits of buoyant capacity in pounds, the method of manual release, the notation "DO NOT PAINT", Coast Guard approval number, the Marine Inspection Office identification letters, and the letters "USCG".

(2) *Inspection tag markings.* Each hydraulic release shall be provided at its time of manufacture with a 2″ by 3½″ stainless steel tag of a minimum thickness of 0.032 inch. This tag shall be permanently attached to a hydraulic release with a single stainless steel link made of wire ³⁄₁₆″ in diameter. This link shall provide nonrigid attachment of the tag to the hydraulic release. The top of the inspection tag shall be stamped in block characters not less than ⅛″ in height with the original lot number of the hydraulic release, its date of manufacture, and its release depth range in feet. The remaining space on the tag will be used for the stamping of periodic servicing test dates and the Marine Inspection Office identification letters as described in § 160.062-4(f).

(46 U.S.C. 375, 416; 49 U.S.C. 1655(b); 49 CFR 1.4(b), and 1.46)

[CGFR 68-32, 33 FR 5721, Apr. 12, 1968, as amended by CGD75-186, 41 FR 10437, Mar. 11, 1976]

§ 160.062-6 Procedure for approval.

(a) *General.* Hydraulic releases for use on vessels subject to Coast Guard inspection are approved only by the

Commandant, U.S. Coast Guard, Washington, D.C. 20591. Application for approval and correspondence pertaining to this specification shall be addressed to the Commander of the Coast Guard District in which the factory is located.

(b) *Manufacturer's drawings and specifications.* The manufacturer must submit to the Commander of the Coast Guard District in which a proposed hydraulic release is to be manufactured, four copies of the—

(1) Detailed part and assembly drawings of the proposed device; and

(2) Specifications of the proposed device.

(c) *Preapproval samples.* When the Commander of the Coast Guard District has been notified that the plans and specifications are satisfactory, a marine inspector will be detailed to the factory to observe the production facilities and manufacturing methods and to select at random from not less than fifteen (15) hydraulic releases already manufactured, a sample of eight (8) specimens for the preapproval tests described in § 160.062-4(c). The four (4) specimens required for the "Physical and operational tests" under § 160.062-4(c) will be forwarded prepaid by the manufacturer to the Commandant for the necessary testing at a Government laboratory in accordance with the schedule outlined in § 160.062-4(c). Costs of these laboratory tests of the preapproval sample shall be borne by the manufacturer. A copy of the marine inspector's report of the results of the "Visual and dimensional examination" of § 160.062-4(c) shall be forwarded to the Commandant.

(d) *Approval.* If all is satisfactory, an approval number will be assigned to the manufacturer for the hydraulic release submitted, and a certificate of approval issued describing the approval granted together with limitations, if any, which are applicable.

[CGFR 68-32, 33 FR 5721, Apr. 12, 1968, as amended by CGD 73-153R, 40 FR 4422, Jan. 30, 1975]

§ 160.062-7 Procedures for acceptance of repair facility.

(a) Before a repair facility is accepted by the Commandant to perform the services required in § 160.062-4(f), it must be inspected by the cognizant Officer in Charge, Marine Inspection, to determine if it has—

(1) The testing apparatus to perform all the tests required in § 160.062-4;

(2) A source of supply of replacement parts for a hydraulic release, evidenced by a signed agreement between the facility and his source of supply, or the parts for it; all replacement parts must be in compliance with applicable specifications and standards contained in § 160.062-1; and

(3) Employees competent to perform the services required in this paragraph. Each employee who is engaged in serving a hydraulic release must demonstrate his competence to the Officer in Charge, Marine Inspection by—

(i) Disassembling a hydraulic release;

(ii) Making all necessary repairs to the disassembled unit;

(iii) Reassembling the unit in conformance with the specifications and standards contained in § 160.062-1(a); and

(iv) Showing that the reassembled unit meets the buoyant capacity and release depth requirements contained in § 160.062-3(b) and (c) after being inspected and tested in conformance with the requirements contained in § 160.062-4(f).

(b) Based on the report of the Officer in Charge, Marine Inspection, regarding the inspection required in paragraph (a) of this section, the Commandant notifies the facility that—

(1) It is an accepted repair facility for the reconditioning and testing of hydraulic releases; or

(2) It is not accepted as a repair facility, lists each discrepancy noted by the Officer in Charge, Marine Inspection, and describes the procedure for reinspection if applicable corrections are made.

[CGD 73-153R, 40 FR 4422, Jan. 30, 1975]

§ 160.062-8 Procedures for acceptance of testing facility.

(a) The Commandant may consider the acceptance of a facility that conducts only the submergence test contained in § 160.062-4(c)(2)(i). Before a facility is accepted by the Commandant to conduct this test, it must be inspected by the cognizant Officer in Charge, Marine Inspection, to determine if it has—

(1) The testing apparatus to perform the test required in § 160.062-4(c)(2)(i); and

(2) Employees competent to perform the test required in § 160.062-4(c)(2)(i). Each employee who is engaged in testing a device must demonstrate his competence to the Officer in Charge, Marine Inspection by conducting a submergence test.

(b) Based on the report of the Officer in Charge, Marine Inspection, regarding the inspection required in paragraph (a) of this section, the Commandant notifies each applicant, in accordance with the procedures described in § 160.062-7(b), whether or not it is an accepted testing facility.

(R.S. 4400, as amended, sec. 6(b)(1), 80 Stat. 937; 49 U.S.C. 1655(b)(1)); 49 CFR 1.46(b)).

[CGD 73-153R, 40 FR 4422, Jan. 30, 1975]

Subpart 160.064—Marine Buoyant Devices

AUTHORITY: R.S. 4405, as amended, and 4462, as amended; 46 U.S.C. 375, 416. Interpret or apply R.S. 4426, as amended, 4488, as amended, 4491, as amended, secs. 6, 17, 54 Stat. 164, as amended, 166, as amended, sec. 3, 70 Stat. 152; 46 U.S.C. 404, 481, 489, 526e, 526p, 390b. Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-20, June 18, 1956, 21 FR 4894; 167-38, October 26, 1959, 24 FR 8857.

SOURCE: CGFR 64-30, 29 FR 7388, June 6, 1964, unless otherwise noted.

§ 160.064-1 Applicable specifications.

(a) *Specifications.* There are no other Coast Guard specifications applicable to this subpart.

§ 160.064-2 Types and models.

(a) *Types.* Water safety buoyant devices covered by this subpart shall be of two general types, viz, those intended to be worn on the body and those intended to be thrown.

(b) *Models.* Water safety buoyant devices may be of different models which incorporate characteristics considered valuable for safety in various fields of water sports or boating activities.

(c) *Sizes.* Water safety buoyant devices designed to be worn shall be of sizes suitable for adults or children, as intended and marked on the device. Water safety buoyant devices intended to be thrown in water shall be of a minimum size intended for adults.

(d) *Dimensions.* A foam cushion designed to be thrown must be 2 inches or more in thickness and must have 225 or more square inches of top surface area.

[CGFR 64-30, 29 FR 7388, June 6, 1964, as amended by CGD 73-246R, 39 FR 36967, Oct. 16, 1974]

§ 160.064-3 Requirements.[1]

(a) *General.* Every water safety buoyant device shall conform to the requirements as accepted by the Commandant for listing and labeling by a recognized laboratory, and shall be of such design, materials, and construction as to meet the requirements specified in this section.

(b) *Designs and constructions.* Water safety buoyant devices shall be of designs suitable for the purposes intended. A design intended to be worn on the body shall be capable of being adjusted and secured to fit the range of wearers for which designed with as few fastenings or adjustments as are consistent with the purpose of the device. Designs may be varied, but shall not provide means intended for fastening or securing the device to a boat. The arrangement of the buoyancy of devices intended to be worn on the body shall provide for flotation of the wearer in an upright, slightly backward position in the water to as great a degree as is consistent with the special purpose intended, and in no case shall the device have a tendency to turn the wearer face downward in the water. Devices intended to be thrown shall not provide means for adjustment or close fitting to the body. Methods of construction shall provide strengths, with reinforcements where necessary, to be adequate for the intended use and purpose of the device.

---

[1] The manufacturer of a personal flotation device must meet 33 CFR 181.701 through 33 CFR 181.705 which require an instruction pamphlet for each device that is sold or offered for sale for use on recreational boats.

(c) *Materials.* All materials used in any device covered by this subpart shall be all new materials and shall be suitable for the purpose intended and shall be at least equivalent to corresponding materials specified for standard buoyant vests or buoyant cushions. Hardware or fastenings shall be of sufficient strength for the purpose of the device and shall be of inherently corrosion-resistant material, such as stainless steel, brass, bronze, certain plastics, etc. Decorative platings of any thickness are permissible. Fabrics, coated fabrics, tapes, webbing, and thread shall be selected with a view to the purposes of the device and shall be either mildew resistant or treated for mildew resistance. Buoyancy shall be provided by inherently buoyant material and shall not be dependent upon loose, granulated material, gas compartments or inflation. So long as the minimum required buoyancy is provided by inherently buoyant material, the use of supplementary gas compartments, or inflation, will be permitted to supply additional buoyancy.

(d) *Buoyancy.* (1) Buoyancy for devices to be worn is as follows:

(i) Devices for persons weighing more than 90 pounds must have 15½ pounds or more of buoyancy.

(ii) Devices for persons weighing 50 to 90 pounds must have 11 pounds or more of buoyancy.

(iii) Devices for persons weighing less than 50 pounds must have 7 pounds or more of buoyancy.

(2) Buoyancy for devices to be thrown is as follows:

(i) Ring life buoys must have 16½ pounds or more of buoyancy.

(ii) Foam cushions must have 18 pounds or more of buoyancy.

(iii) A device other than those specified in paragraph (d)(2)(i) or (ii) of this section must have 20 pounds or more of buoyancy.

(3) The buoyancy values required in paragraph (d)(1) and (2) of this section must be as follows:

(i) For each device containing foam buoyant materials, the required buoyancy value must remain after the device has been submerged in fresh water for 24 or more continuous hours.

(ii) For each device containing kapok, the required buoyancy value must remain after the device has been submerged in fresh water for 48 or more continuous hours.

(e) *Workmanship.* Water safety buoyant devices covered by this subpart shall be of first class workmanship and shall be free from any defects materially affecting their appearance or serviceability.

[CGFR 64-30, 29 FR 7388, June 6, 1964, as amended by CGD 73-246R, 39 FR 36967, Oct. 16, 1974; CGD 75-008, 43 FR 9772, Mar. 9, 1978]

§ 160.064-4 Marking.

(a) Each water safety buoyant device must have the following information clearly marked in waterproof lettering:

(1) For devices to be worn:

(Type II or Type III) Personal Flotation Device.
Inspected and tested in accordance with U.S. Coast Guard regulations.
(Name of buoyant material) buoyant material provides a minimum buoyant force of (15½ lb., 11 lb., or 7 lb.).
(Special purpose intended.).
Approved for use on all recreational boats and on uninspected commercial vessels less than 40 feet in length not carrying passengers for hire by persons weighing (more than 90 lb., 50 to 90 lb., 30 to 50 lb., or less than 30 lb.).
U.S. Coast Guard Approval No. 160.064/(assigned manufacturer's No.)/(Revision No.); (Model No.).
(Name and address of manufacturer or distributor).
(Lot No.).

(2) For devices to be thrown:

Type IV Personal Flotation Device.
Inspected and tested in accordance with U.S. Coast Guard regulations.
(Name of buoyant material) buoyant material provides a minimum buoyant force of (16½ lb., 18 lb., or 20 lb.).
(Special purpose intended).
Approved for use on all recreational boats less than 16 feet in length and all canoes and kayaks, and only as a throwable device on all other recreational boats.
U.S. Coast Guard Approval No. 160.064/(assigned manufacturer's No.)/(Revision No.); (Model No.).
(Name and address of manufacturer or distributor).
(Lot No.).

(b) *Durability of marking.* Marking shall be of a type which will be durable and legible for the expected life of the device.

[CGFR 64-30, 29 FR 7388, June 6, 1964, as amended by CGD 72-163R, 38 FR 8122, Mar. 28, 1973; CGD 73-246R, 39 FR 36967, Oct. 16, 1974; CGD 75-008, 43 FR 9772, Mar. 9, 1978]

§ 160.064-5 Recognized laboratory.

To be designated a recognized laboratory, the laboratory must be:

(a) Operated as a nonprofit public service;

(b) Engaged regularly in the examination, testing and evaluation of the safety of materials, installation, and devices for marine use; and

(c) Established in factory inspection and listing and labeling by having an existing program and standards for evaluation, listing, and labeling buoyant devices that are acceptable to the Commandant.

[CGD 72-163R, 38 FR 8123, Mar. 28, 1973]

§ 160.064-5a Designated recognized laboratory.

Underwriters' Laboratories, Inc., Marine Department, Tampa East Industrial Park, 2602 Tampa East Boulevard, Tampa, FL 33619, is a recognized laboratory.

[CGD 72-163R, 38 FR 8123, Mar. 28, 1973]

§ 160.064-5b Compliance label.

If a recognized laboratory approves a buoyant device, the device is allowed to carry the compliance label of the recognized laboratory.

[CGD 72-163R, 38 FR 8123, Mar. 28, 1973]

§ 160.064-6 Examinations, tests and inspections.

(a) *Manufacturer's inspection and tests.* Manufacturers of listed and labeled water safety buoyant devices shall maintain quality control of the materials used, manufacturing methods and the finished product so as to meet the applicable requirements, and shall make sufficient inspections and tests of representative samples and components produced to maintain the quality of the finished product. Records of tests conducted by the manufacturer and records of materials, including affidavits by suppliers that applicable requirements are met, entering into construction shall be made available to the recognized laboratory inspector or to the Coast Guard marine inspector, or both, for review upon request.

(b) *Laboratory inspections and tests.* Such examinations, inspections and tests as are required by the recognized laboratory for listed and labeled devices produced will be conducted by the laboratory inspector at the place of manufacture or other location at the option of the laboratory.

(c) *Test facilities.* The laboratory inspector, or the Coast Guard marine inspector assigned by the Commander of the District in which the factory is located, or both, shall be admitted to any place in the factory where work is being done on listed and labeled products, and either or both inspectors may take samples of parts or materials entering into construction or final assemblies, for further examinations, inspections, or tests. The manufacturer shall provide a suitable place and the apparatus necessary for the performance of the tests which are done at the place of manufacture.

(d) *Additional tests, etc.* Unannounced examinations, tests, and inspections of samples obtained either directly from the manufacturer or through commercial channels may be made to determine the suitability of a product for listing and labeling, or to determine conformance of a labeled product to the applicable requirements. These may be conducted by the recognized laboratory or the United States Coast Guard.

[CGFR 64-30, 29 FR 7388, June 6, 1964, as amended by CGD 73-246R, 39 FR 36967, Oct. 16, 1974]

§ 160.064-7 Procedure for listing and labeling.

(a) A recognized laboratory must inform each manufacturer that requests listing and labeling of a water safety device for use on boats not carrying passengers for hire, of the procedures for:

(1) Inspection;

(2) Examination;

(3) Tests; and

(4) The forwarding to the Coast Guard of the test report and the description of the quality control program of the requesting manufacturer.

(b) The cost of any examination, test, and inspection and the cost of listing and labeling must:

(1) Be paid by the manufacturer; and

(2) Be the same for similar services for each manufacturer.

(c) The Coast Guard reviews each test report and quality control procedure forwarded by the recognized laboratory to determine if the approval requirements have been met. After the review is completed, the Coast Guard:

(1) Notifies the laboratory that the device is approved; and

(2) Publishes notice of the approval in the FEDERAL REGISTER and Coast Guard publication CG-190.

(d) The Commandant, U.S. Coast Guard, determines all matters concerning approval requirements. The manufacturer or recognized laboratory may at any time request advice from the Commandant regarding these requirements.

[CGD 72-163R, 38 FR 8123, Mar. 28, 1973, as amended by CGD 73-246R, 39 FR 36967, Oct. 16, 1974]

§ 160.064-8 Termination of listing and labeling.

(a) Listing and labeling as a water safety buoyant device acceptable to the Commandant as approved may be terminated, withdrawn, cancelled, or suspended by written notice to the recognized laboratory from the Commandant, or by written notice to the manufacturer from the recognized laboratory or from the Commandant.

(b) The condition which may be the cause for termination of listing and labeling may be any of the following:

(1) When the manufacturer does not desire to retain the service.

(2) When the listed product is no longer being manufactured.

(3) When the manufacturer's own program does not provide suitable assurance of the quality of the listed and labeled product being manufactured.

(4) When the product manufactured no longer conforms to the current applicable requirements of the Coast Guard and the recognized laboratory.

(5) When service experience or laboratory or U.S. Coast Guard reports indicate a product is unsatisfactory or does not accomplish its designated special purpose.

[CGFR 64-30, 29 FR 7388, June 6, 1964, as amended by CGD 73-246R, 39 FR 36967, Oct. 16, 1974]

§ 160.064-9 Penalties.

(a) All violations of the conditions for listing and labeling by a recognized laboratory are subject to the same penalties as violations of the conditions for U.S. Coast Guard approval provided by other subparts of this subchapter.

Subpart 160.066—Distress Signal for Boats, Red Aerial Pyrotechnic Flare

AUTHORITY: Section 5, 85 Stat. 215 as amended, 46 U.S.C. 1454; 49 CFR 1.46(n)(1).

SOURCE: CGD 76-183a, 44 FR 73050, Dec. 17, 1979, unless otherwise noted.

§ 160.066-1 Type.

(a) Red aerial pyrotechnic distress signals specified by this subpart must be either self-contained or pistol launched, and either meteor or parachute assisted type.

§ 160.066-5 Design, construction, and manufacturing requirements.

(a) Each signal must be either:

(1) A self-contained unit with all necessary components for firing the signal, or

(2) A cartridge intended for firing from a signal pistol that is approved under Subpart 160.028 of this chapter.

(b) Each signal unit must have an interior chamber which contains the main propulsion charge and which is constructed so that it is capable of withstanding the forces generated by ignition without rupture, crack, or deformation of any kind.

(c) Signals must be constructed in lots numbered serially by the manufacturer. A new lot must be started when:

(1) Any change in construction details occurs;

(2) Any change in sources of raw materials occurs;

(3) Production is started on a new production line or on a previously discontinued production line; or

(4) A lot exceeds 30,000 units.

§ 160.066–7 Performance requirements

(a) Each signal must:

(1) Burn "vivid red" when tested as specified in §160.021-4(d)(7) for at least 5.5 seconds.

(2) Have a peak luminous intensity of at least 10,000 candela.

(3) Burn a total of not less than 1,000 candleminutes (Cm) using the formula

I × T = Cm where:

I = the luminous intensity measured as in subsection (c);

T = the total burn time of the device in minutes; and

Cm = the candle-minute rating of the device.

(4) Burn out completely before falling back to the level of launch.

(5) Function in a manner that would not cause burns or injury to an unprotected person firing the signal in accordance with the manufacturer's instructions.

(6) Not malfunction in a manner that would cause burns or injury to an unprotected person firing the signal in accordance with the manufacturer's instructions.

(b) Each signal must meet the requirements of paragraph (a) after:

(1) Submersion in water for 24 hours, or

(2) If protected by a sealed container, submersion in water for 24 hours inside the sealed container immediately followed by submersion for 10 minutes without the container, and

(3) Being exposed to the Elevated Temperature, Humidity, and Storage Test in §160.066–13(b).

(c) Testing for burn time and luminous intensity pursuant to paragraphs (a)(1) and (a)(2), respectively, shall be conducted in conformity with the following requirements and procedures:

(1) The chart speed of the light measuring equipment shall not be slower than 5 seconds per inch;

(2) The chart sweep of the light measuring equipment shall not be slower than .5 seconds for full scale;

(3) The first and last seconds of the burn shall be eliminated in measuring luminous intensity;

(4) The time during which the candle burns (excluding first and last seconds of burn) is to be used to determine the luminous intensity by averaging the readings taken during the burning; and

(5) Burn time is to be measured from first light of the signal to dark.

§ 160.066–9 Labeling.

(a) Each signal must be legibly and indelibly marked with the following information:

(1) The manufacturer's name,

(2) The designed burning time of the pyrotechnic candle(s),

(3) The specific signal pistol for which the signal is designed, if any,

(4) The lot number,

(5) The Coast Guard approval number,

(6) Operation and storage instructions,

(7) The month and year of expiration determined by § 160.066–10, and

(8) The words:

"Aerial Flare. Acceptable as a Day and Night Visual Distress Signal for boats as required by 33 CFR 175.110. For Emergency Use Only".

(b) If the signal is too small to contain all of the information required by paragraph (a) and any labeling which may be required by paragraph (d), the information required by subparagraphs (a) (2), (6), and (8) may be printed on a separate piece of paper packed with each signal or with the smallest container in which several signals are packed.

(c) The largest carton or box in which the manufacturer ships signals must be marked with the following or equivalent words: "Keep under cover in a dry place."

(d) Compliance with the labeling requirements of this section does not relieve the manufacturer of the responsibility of complying with the label requirements of the Federal Hazardous Substances Act, 15 U.S.C. 1263.

§ 160.066–10 Expiration date.

Each approved signal must have an expiration date marked on it. That date must not be more than forty-two months from date of manufacture.

§ 160.066-11 Approval procedures.

(a) Red aerial pyrotechnic flare distress signals are approved under the procedures of subpart 159.005 of this chapter.

(b) The manufacturer must produce a lot of at least 100 signals from which samples for approval testing must be drawn. Approval testing must be conducted in accordance with the operational tests in § 160.066-12 and the technical tests in § 160.066-13. In order for the signal to be approved, the samples must pass both the operational and the technical tests.

(c) The approval tests must be performed by an independent laboratory accepted by the Commandant under § 159.010 of this chapter. A list of independent laboratories accepted by the Commandant is in § 160.066-18.

§ 160.066-12 Operational tests.

(a) The procedure for conducting operational tests is described in figure (1).

(1) An "accept lot" decision must be reached in order to pass the operational tests.

(2) If a "reject lot" decision is reached, the entire lot is rejected.

(3) Signals from "reject lots" may be reworked by the manufacturer to correct the deficiency for which they were rejected and be resubmitted for inspection. Records shall be kept of the reasons for rejection, the reworking performed on the "reject lot", and the result of the second test. Signals from "reject lots" may not, unless subsequently accepted, be sold or offered for sale as being in compliance with this specification.

(b) Each signal selected for the operational tests must be conditioned by:

(1) Being submerged under at least 25 mm (1 in.) of water for 24 hours without any protection other than its waterproofing; or

(2) If waterproofing is provided by a sealed plastic bag or other waterproof packaging, submersion under 25 mm (1 in.) of water for 24 hours in the packaging, followed immediately by submersion under 25 mm (1 in.) of water for 10 minutes with the signal removed from the packaging.

(c) After each signal selected has undergone the conditioning required by paragraph (b) of this section it must be fired as described by the manufacturer's operating instructions. The following data as observed must be recorded for each signal:

(1) Burning time of the pyrotechnic candle;

(2) Color;

(3) Whether the pyrotechnic candle burns out above, at, or below the level of launch.

(d) A signal fails the operational tests if:

(1) It fails to fire,

(2) The pyrotechnic candle fails to ignite,

(3) The pyrotechnic candle continues to burn after it falls back to the level of launch,

(4) The observed color is other than vivid red, or

(5) The burning time is less than 5.5 seconds.

(e) A lot is rejected if a "reject lot" decision is reached using Figure (1) and Table 1 after completion of the operational tests.

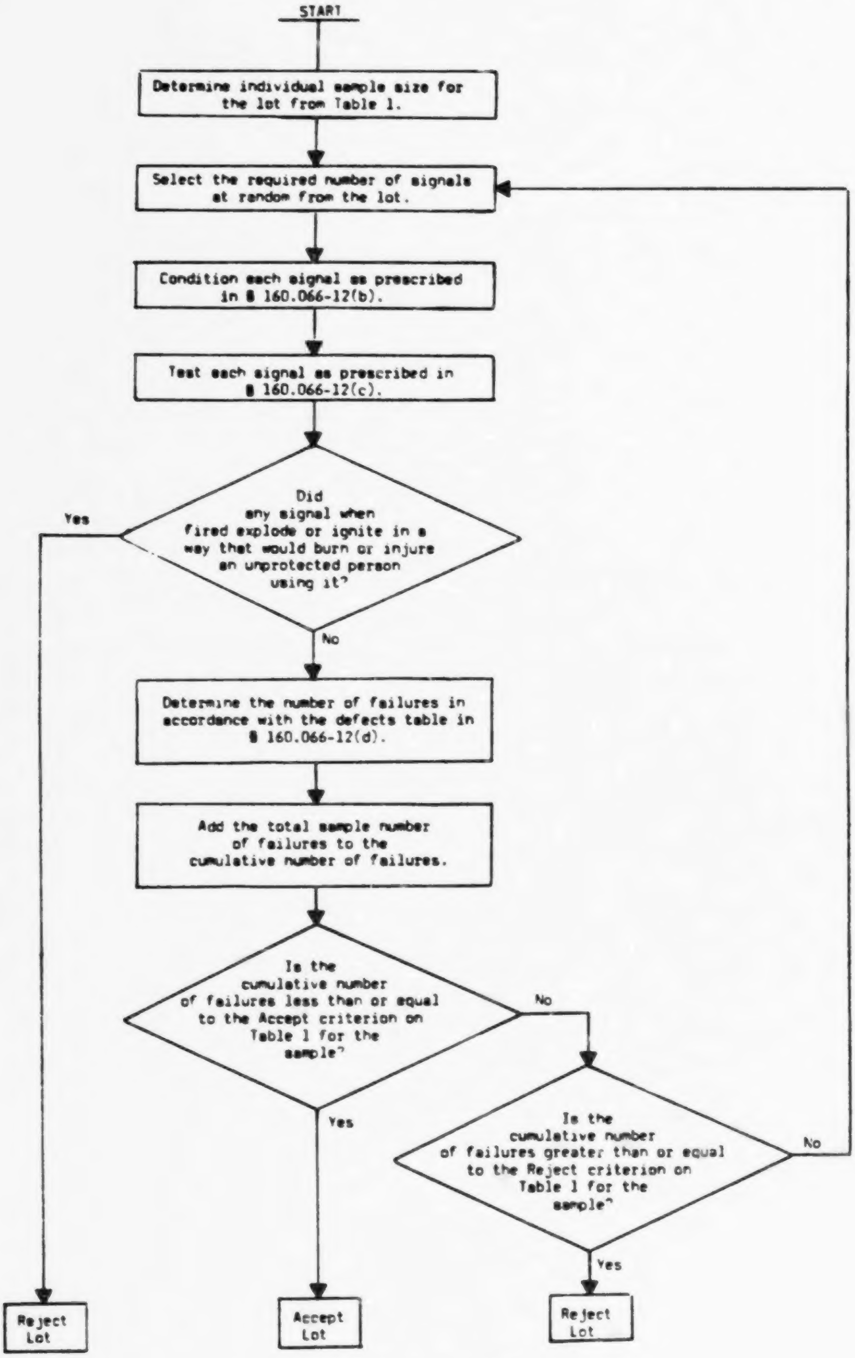

START
Determine individual sample size for the lot from Table 1.
Select the required number of signals at random from the lot.
Condition each signal as prescribed in § 160.066-12(b).
Test each signal as prescribed in § 160.066-12(c).
Did any signal when fired explode or ignite in a way that would burn or injure an unprotected person using it?
Yes
No
Determine the number of failures in accordance with the defects table in § 160.066-12(d).
Add the total sample number of failures to the cumulative number of failures.
Is the cumulative number of failures less than or equal to the Accept criterion on Table 1 for the sample?
No
Yes
Is the cumulative number of failures greater than or equal to the Reject criterion on Table 1 for the sample?
No
Yes
Reject Lot
Accept Lot
Reject Lot

Figure 1. Operational test procedure.

TABLE 1—Accept and Reject Criteria for Operational Test Lots

Lot size	Individual sample size	Sample	Cumulative sample size	Accept [1]	Reject [1]
280 or less	8	First	8	([2])	4
		Second	16	1	5
		Third	24	2	6
		Fourth	32	3	7
		Fifth	40	5	8
		Sixth	48	7	9
		Seventh	56	9	10
281 to 500	13	First	13	([2])	4
		Second	26	1	6
		Third	39	3	8
		Fourth	52	5	10
		Fifth	65	7	11
		Sixth	78	10	12
		Seventh	91	13	14
501 to 1,200.	20	First	20	([2])	5
		Second	40	3	8
		Third	60	6	10
		Fourth	80	8	13
		Fifth	100	11	15
		Sixth	120	14	17
		Seventh	140	18	19
1,201 to 3,200.	32	First	32	1	7
		Second	64	4	10
		Third	96	8	13
		Fourth	128	12	17
		Fifth	160	17	20
		Sixth	192	21	23
		Seventh	224	25	26
More than 3,200.	50	First	50	2	9
		Second	100	7	14
		Third	150	13	19
		Fourth	200	19	25
		Fifth	250	25	29
		Sixth	300	31	33
		Seventh	350	37	38

[1] Cumulative number of failures.

[2] Lot may not be accepted. Next sample must be tested.

§ 160.066–13 Technical tests.

(a) The following conditions apply to technical tests as described in this section:

(1) A total of nine signals must be selected at random from the lot being tested;

(2) If the signals are protected by sealed packaging, then the conditioning for the technical tests must be conducted with the signal in the sealed packaging;

(3) If signals in the test sample fail to pass one of the technical tests, the entire lot is rejected;

(4) Signals from "reject lots" may be reworked by the manufacturer to correct the deficiency for which they were rejected and be resubmitted for inspection. Records shall be kept of the reasons for rejection, the reworking performed on the "reject lot", and the result of the second test. Signals from "reject lots" may not, unless subsequently accepted, be sold or offered for sale as being in compliance with this specification.

(b) The Elevated Temperature, Humidity, and Storage Test must be conducted in the following manner:

(1) Select three signals from the nine;

(2) Place each signal in a thermostatically controlled even-temperature oven held at 55 Degrees C (131 Degrees F), and at not less than 90% relative humidity, for at least 72 hours (If for any reason it is not possbie to operate the oven continuously for the 72 hour period, it may be operated at the required temperature and humidity for 8 hours of each 24 during the 72 hour conditioning period.);

(3) After removal from the oven immediately place each signal in a chamber:

(i) At a temperature of at least 20 degrees C (68 degrees F) but not more than 25 degrees C (77 degrees F);

(ii) At not less than 65% relative humidity;

(iii) For ten days;

(4) Then remove each signal from any sealed packaging and fire it.

(5) The test sample fails the test if:

(i) Any signal ignites or decomposes before firing;

(ii) Any signal when fired malfunctions in a manner that would cause burns or injury to an unprotected person firing the signal, or;

(iii) Two or more of the signals fail to project and ignite the pyrotechnic candle.

(c) The Spontaneous Combustion Test must be performed in the following manner:

(1) Select three signals from the remaining six signals and place them in a thermostatically controlled even temperature over for 48 hours at a temperature of 75 degrees C (167 degrees F).

(2) The test sample fails the test if any signal ignites or decomposes during the test.

(d) The Luminous Intensity and Chromaticity Test must be performed in the following manner:

(1) Remove the pyrotechnic candle from the remaining three signals.

(2) Ignite, measure, and record the intensity of the burning candle with a visual photometer or equivalent photometric device or automatic recorder:

(i) While the specimen is supported in a horizontal position and the photometer is at right angles to the axis of the specimen,

(ii) At a distance of at least 3 m (10 ft.).

(3) Calculate the intensity of the candle as in § 160.066-7(c).

(4) Measure and record the chromaticity of the burning candle as specified in § 160.021-4(d)(4).

(5) The test sample fails the test if more than one signal has a luminous intensity of less than 10,000 candela, or more than one signal is not "vivid red".

§ 160.066-15 Production testing.

(a) Production tests must be performed under the procedures in subpart 159.007 of this chapter.

(b) The operational tests in § 160.066-12 must be performed for every lot of signals produced.

(c) The technical tests in § 160.066-13 must be performed at least once every twelve months,or at least once every 10 lots, whichever occurs first.

(d) If a lot is rejected on the basis of the technical tests, then each subsequent lot produced must be tested according to the technical tests until samples from a lot pass these tests.

(e) An independent laboratory acceptable to the Commandant must perform or directly supervise:

(1) Each technical test, and

(2) All operational tests for at least four lots in a 12 month period, unless fewer than four lots are produced in a 12 month period. If less than four lots are produced in a 12 month period, each operational test must be performed or directly supervised by the independent laboratory.

(f) If a lot selected by the independent laboratory for an operational test is rejected, then the operational tests for the next lot produced, and the rejected lot, if reworked, must be performed or directly supervised by the independent laboratory. The tests required by this paragraph must not be counted for the purpose of meeting the requirements of paragraph (e).

(g) The independent laboratory selects the lots upon which technical tests are performed.

(h) If the manufacturer produces more than four lots within a 12 month period, the independent laboratory selects the lots for which it performs or directly supervises the operational tests.

(i) The operational test performed or directly supervised by the independent laboratory must occur at least once during each quarterly period, unless no lots are produced during that period.

(j) The independent laboratory, when it performs or directly supervises the technical tests required by paragraph (c) or (d) of this section, must inspect the signals selected for testing and compare them with the approved plans. Each signal inspected must conform to the plans.

§ 160.066-18 Recognized independent laboratories.

(a) The following are independent laboratories acceptable to the Commandant for approval and production testing under this subpart:

(b) Revised copies of this list may be obtained from Commandant (G-MMT-3/TP42), U.S. Coast Guard Headquarters, Washington, D.C. 20593.

Subpart 160.071—Exposure Suits

AUTHORITY: 46 U.S.C. 375, 391a, 416, and 481; 49 U.S.C. 1655(b); 49 CFR 1.46.

SOURCE: CGD 76-033a, 45 FR 24478, Apr. 10, 1980, unless otherwise noted.

§ 160.071-1 Scope.

This subpart contains construction and performance requirements, and approval tests for adult and child exposure suits that are designed to prevent shock upon entering cold water and lessen the effect of hypothermia (body heat loss duirng long periods of immersion).

§ 160.071-3 Applicable regulations and standards incorporated by reference.

(a) This subpart makes reference to the following Coast Guard regulations:

(1) Subpart 161.012 of this chapter (Personal Flotation Device Lights).

(2) Subpart 164.018 of this chapter (Retro-reflective Material for Lifesaving Equipment).

(b) The following standards of the American Society for Testing and Materials are incorporated by reference into this subpart:

(1) ASTM B 117-73 (Reapproved 1979), Standard Method of Salt Spray (Fog) Testing.

(2) ASTM C 177-76, Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Guarded Hot Plate.

(3) ASTM C 518-76, Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter.

(4) ASTM D 1004-66 (Reapproved 1976), Tear Resistance of Plastic Film and Sheeting.

(c) The following Federal Standards are incorporated by reference into this subpart:

(1) Federal; Test method Standard No. 191a dated July 20, 1978, Method 5304.1, Abrasion Resistance of Cloth; Oscillatory Cylinder (Wyzenbeek) Method, dated July 9, 1971.

(2) Federal Standard No. 751a, Stitches, Seams, and Stitchings, dated January 25, 1965.

(d) Underwriters Laboratories Standard UL 1191, FIRST EDITION (Standard for Components for Personal Flotation Devices), as revised March 29, 1977, has been incorporated by reference into this subpart.

(e) The standards listed in paragraphs (b), (c), and (d) of this section may be obtained as follows:

(1) ASTM standards may be purchased from the American Society for Testing and Materials, 1916 Race St. Philadelphia, PA 19103.

(2) The Federal Standards may be purchased from Customer Service, Naval Publications Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

(3) The UL Standard may be purchased from Underwriters Laboratories, 2606 Tampa East Blvd., Tampa, FL 33619.

(f) The documents listed in this section are also on file in the FEDERAL REGISTER library.

(g) When changes are made to a standard incorporated by reference into this subpart, the effective date for its use will be the effective date set by the issuing authority unless otherwise determined by the Coast Guard.

(h) Notice will be published in the FEDERAL REGISTER of any changes made to a standard incorporated by reference into this subpart.

(i) Approval to incorporate by reference the materials listed in this section was obtained from the Director of the FEDERAL REGISTER on November 13, 1979.

§ 160.071-5 Independent laboratory.

(a) The approval and production tests in this subpart must be conducted by an independent laboratory accepted by the Coast Guard under Subpart 159.010 of this chapter.

§ 160.071-7 Approval procedure.

(a) *General.* An exposure suit is approved by the Coast Guard under the procedures in Subpart 159.005 of this chapter.

(b) *Approval testing.* Each approval test must be conducted in accordance with § 160.071-17 or § 160.071-19.

(c) *Approval of child size suit.* No child size suit will be approved unless the adult size of the suit has been approved.

§ 160.071-9 Construction.

(a) *General.* Each exposure suit must be constructed primarily of a closed-cell flexible foam that meets the buoyancy and thermal insulation requirements in § 160.071-11 (a) and (c). Each suit must be designed to cover the wearer's entire body, except for the area of the nose and eyes.

(b) *Impact resistance and body strength.* The body of each adult size suit must be designed so that it is not damaged when tested as prescribed in § 160.071-17 (c)(11) and 17(1). The body of each child size suit must be designed so that it is not damaged when tested as prescribed in § 160.071-19(c).

(c) *Seams.* Stitching used in each structural seam of an exposure suit must be lock type stitching that meets the requirements in Federal Standard No. 751a for one of the following:

(1) Class 300 Lockstitch.

(2) Class 400 Multithread chain stitch.

(3) Class 700 Single thread lockstitch.

(d) *Seam strength.* Each seam must have a strength of at least 225 N(50 lb.).

(e) *Closures and seals.* Each closure and seal must be designed so that the suit can meet the water penetration requirements of § 160.071-11(f).

(f) *Hardware.* All hardware of an exposure suit must be of a size and design that allows ease of operation by the wearer. The hardware must be attached to the suit in a manner that allows the wearer to operate it easily and that prevents it from attaining a position in which it can be operated improperly.

(g) *Metal parts.* Each metal part of an exposure suit must be—

(1) 410 stainless steel or have salt water and salt air corrosion characteristics equal or superior to 410 stainless steel; and

(2) Galvanically compatible with each other metal part in contact with it.

(h) *Suit exterior.* The primary color of the exterior surface of each suit must be international orange. The exterior surface of the suit must not tear or abrade when tested as prescribed in §§ 160.071-17 (n) and (o).

(i) *Buoyant materials and compartments.* Buoyant materials used in a suit must not be loose or granular. The suit must not have an inflated or inflatable compartment, except as prescribed in § 160.071-11(a)(4).

(j) *Hand and arm construction.* The hand of each suit must be a glove that allows sufficient dexterity for the wearer to pick up a 9.5 mm (⅜ in.) diameter wooden pencil from a table and write with it. The glove may not be removeable unless it is attached to the arm and unless it can be secured to the arm or stowed in a pocket on the arm when not in use. A removeable glove must be designed so that only a small amount of water can enter the glove during use. Each arm with a removeable glove must have a wristlet seal that meets paragraph (e) of this section.

(k) *Leg construction.* Each suit must be designed to prevent air from becoming trapped in its legs when the wearer enters the water headfirst.

(l) *Foot construction.* Each leg of a suit must have a foot that has a hard sole or enough room for a work shoe to be worn inside. The sole of each foot must be—

(1) Natural or synthetic rubber that is ribbed or bossed for skid resistance; and

(2) Designed to prevent the wearer from slipping when the suit is tested as prescribed in § 160.071-17(c)(5).

(m) *Size.* Each adult suit must fit persons ranging in weight from 50 kg (110 lb.) to 150 kg (330 lb.) and in height from 1,500 mm (59 in.) to 1,900 mm (75 in.). Each child size suit must fit children ranging in weight from 20 kg (44 lb.) to 50 kg (110 lb.) and in height from 1,000 mm (39 in.) to 1,500 mm (59 in.). Each suit must be capable of being worn comfortably over clothing and must not restrict the wearer's motion. The suit size and design must allow successful completion of the mobility tests prescribed in §§ 160.071-17(c)(2) through (c)(7).

(n) *Retroreflective material.* Each exposure suit must be fitted with Type I retroreflective material that meets Subpart 164.018 of this chapter. When the wearer of an exposure suit is in the face-up, stable floating position described in § 160.071-11(a)(3), at least 200 sq. cm (31 sq. in.) of the material must be visible above water to observers at water level directly in front of the wearer and directly behind the wearer.

(o) *PFD light.* Each exposure suit must be designed so that a light meeting the requirements of Subpart 161.012 of this chapter can be attached to its front shoulder area and so that the light when attached does not damage the suit and cannot adversely affect its performance. If the manufacturer of the suit designates a specific location for the light, or designates a specific model light, this information must be clearly printed on the suit or in the instructions prescribed by § 160.071-15(c).

§ 160.071-11 Performance.

(a) *Buoyancy*. Each suit must meet the following buoyancy requirements as measured in the test conducted under § 160.071-17(h):

(1) The adjusted buoyancy of each adult size suit must be at least 100 N (22 lb.). The adjusted buoyancy of each child size suit must be at least 50 N (11 lb.).

(2) Each suit must have a stable floating position in which the mouth and nose of the wearer are at least 50 mm (2 in.) above the surface of the water.

(3) If this stable floating position is horizontal or nearly so, or if the mouth and nose of the wearer are less than 100 mm (4 in.) above the surface of the water in the stable position, an auxiliary means of buoyancy such as an inflatable bladder must be provided for changing from the horizontal position to a more upright stable floating position. When using the auxiliary means of buoyancy, the mouth and nose of the wearer must be at least 100 mm (4 in.) above the surface of the water, and the torso must be inclined slightly backward from the upright position.

(4) The buoyancy of any auxiliary means of buoyancy must not be counted when determining the buoyancy of the suit.

(b) *Righting*. The suit must be designed to turn the wearer from a face-down position to a face-up position within 10 seconds or to allow the wearer without assistance to turn from a face-down position to a face-up position within 5 seconds. If a suit has an auxiliary means of buoyancy, the suit must be designed to meet this requirement when the auxiliary means of buoyancy is used and when it is not used.

(c) *Thermal protection*. The suit must be designed to protect against loss of body heat as follows:

(1) The thermal conductivity of the suit material when submerged 1 m (39 in.) in water must be less than or equal to that of a control sample of 4.75 mm (3/16 in.) thick, closed-cell neoprene foam. The control sample of foam must have a thermal conductivity of not more than 0.050 watt/meter-°K (0.346 Btu-in./hr.-sq.ft.-°F).

(2) The suit must be able to pass the thermal protection test prescribed in § 160.071-17(d)(6).

(d) *Donning time*. Each suit must be designed so that a person can don the suit correctly within one minute after reading the donning and use instructions described in § 160.071-15(a).

(e) *Vision*. Each suit must be designed to allow unrestricted vision throughout an arc of 60° to either side of the wearer's straight-ahead line of sight when the wearer's head is turned to any angle between 30° to the right and 30° to the left. Each suit must be designed to allow a standing wearer to move head and eyes up and down far enough to see both feet and a spot directly overhead.

(f) *Water penetration*. An exposure suit must not retain more than 5 kg (11 lb.) of water when tested for water penetration as prescribed in § 160.071-17(c)(10).

(g) *Splash protection*. Each suit must have a means to prevent water spray from directly entering the wearer's mouth.

(h) *Storage temperature*. Each suit must be designed so that it will not be damaged by storage in its storage case at any temperature between minus 20° C (minus 4° F) to 60° C (140° F).

(i) *Flame exposure*. Each suit must be designed to be useable after two seconds contact with a gasoline fire.

[CGD 76-033a, 45 FR 24478, Apr. 10, 1980, as amended by 46 FR 23428, Apr. 27, 1981]

§ 160.071-13 Storage case.

(a) Each suit must have a storage case made of vinyl coated cloth or material that provides an equivalent measure of protection to the suit.

(b) Each storage case must be designed so that it is still useable after two seconds contact with a gasoline fire.

§ 160.071-15 Instructions.

(a) Each suit must have instructions for its donning and use in an emergency. The instructions must be in English and must not exceed 50 words. Illustrations must be used in addition to the words.

(b) The instructions required by paragraph (a) of this section must be on the exterior of the storage case or printed on a waterproof card attached to the storage case or to the suit. These instructions must also be available in a form suitable for mounting on a bulkhead of a vessel.

(c) In addition to the instructions required by paragraph (a) of this section, each suit must have instructions on care and repair of the suit and any additional, necessary information concerning stowage and use of the suit on a vessel.

§ 160.071-17 Approval testing for adult size exposure suit.

Caution: During each of the in-water tests prescribed in this section, a person ready to render assistance when needed should be near each subject in the water.

(a) *General.* Each adult size exposure suit must be tested as prescribed in this section. If the suit is also made in a child size, the child size suit must be tested as prescribed in § 160.071-19.

(b) *Test samples.* Each test prescribed in this section may be performed by using as many exposure suits as are needed to make efficient use of the test subjects and test equipment, except that each subject in the impact test described in § 160.071-17(c)(11) must not use more than one suit during the test.

(c) *Mobility and flotation tests.* The mobility and flotation capabilities of each exposure suit must be tested under the following conditions and procedures:

(1) *Test subjects.* Seven males and three females must be used in the tests described in this paragraph. The subjects must represent each of the three physical types (ectomorphic, endomorphic, and mesomorphic). Each subject must be in good health. The heaviest male subject must weight at least 25 kg (55 lb.) more than the lightest male subject. The heaviest female subject must weight at least 25 kg (55 lb.) more than the lightest female subject. Each subject must be unfamiliar with the specific suit under test. Each subject must wear a swimming suit for the in-water tests and ordinary street clothing or work clothing for the other tests.

(2) *Donning time.* Each subject is removed from the view of the other subjects and allowed one minute to examine a suit and the manufacture's instructions for donning and use of the suit in an emergency. At the end of this period, the subject attempts to don the suit as rapidly as possible without the aid of a chair or any support to lean on; however, the subject may sit on the floor. If the subject does not don the suit completely, including gloves and any other accessories, within 60 seconds, the subject removes the suit, examines the instructions for another minute, and again attempts to don the suit. At least nine of the ten subjects must be able to don the suit completely in 60 seconds in at least one of the two attempts.

(3) *Field of vision.* The exposure suit's field of vision must be tested as follows:

(i) While wearing a suit, each subject stands upright and faces straight ahead. An observer is positioned to one side of the subject at an angle of 60° away from the subject's straight-ahead line of sight. The observer must be able to see the subject's closest eye at this position. The observer then walks past the front of the subject to a position on the subject's other side that is at an angle of 60° away from the subject's straight-ahead line of sight. The suit must not obstruct the observer's view of the subject's eyes at any point between the two positions.

(ii) While wearing the suit, each subject stands upright and faces straight ahead. An observer is positioned to one side of the subject at an angle of 90° away from the subject's straight-ahead line of sight. The subject then turns his or her head through an arc of 30° toward the position of the observer. This procedure is repeated with the observer positioned on the other side of the subject at an angle of 90° away from the subject's straight-ahead line of sight. The suit must not obstruct the observer's view of the subject's eyes when the subject's head is turned 30° toward the observer.

(iii) While wearing the suit, each subject stands upright and faces straight ahead. Through a combination of head and eye movement, the subject looks first at a spot directly overhead, then looks at a spot on or between the feet. An observer must verify that the subject can make the necessary head and eye movements while wearing the suit.

(4) *Hand dexterity.* While wearing a suit, including a removable glove if any, each subject must be able to pick up a 9.5 mm (⅜ in.) diameter wooden pencil from a flat hard surfaced table using only one hand. Still using only one hand, the subject must be able to position the pencil and write with it. At least eight of the ten test subjects must be able to complete this test.

(5) *Walking.* A 30 m (100 ft.) long walking course must be laid out on a smooth linoleum floor. The finish on the floor must allow water to lie on it in a sheet rather than in beads. The course may have gradual turns, but must not have any abrupt change in direction. Each subject is timed walking the course two times at a normal pace with the floor dry. Each subject then dons a suit and is timed again walking the course two times with the floor wet. The subject is given adequate rest periods between trials to avoid fatigue. The subject must not slip on the wet floor when wearing the suit. The average time for each subject to walk the course while wearing the suit must be not more than 1.25 times the subject's average time to walk the course without the suit.

(6) *Climbing.* A vertical ladder extending at least 5 meters (17 feet) above a level floor must be used for this test. Each subject is timed two times climbing the ladder to a rung at least 3 meters (10 feet) above the floor. The subject then dons a suit and is again timed two times climbing to the same rung. The subject is given adequate rest periods between trials to avoid fatigue. The average time for each subject to climb the ladder while wearing the suit must be not more than 1.25 times the subject's average time to climb the ladder without the suit.

(7) *Water emergency.* A pool with a wooden platform at one side must be used for this test. The platform must be 300 mm (1 ft.) above the water surface and must not float on the water. The platform must have a smooth painted surface. Each subject enters the water without a suit and swims or treads water for approximately two minutes. The subject must then be able to emerge from the pool onto the platform using only his or her hands on top of the platform as an aid and without pushing off of the bottom of the pool. Any subject unable to emerge onto the platform within 30 seconds is disqualified for this test. At least five subjects must qualify and be used for this test. If less than five subjects of the original ten qualify, substitute subjects may be used. Each qualified subject dons the suit with all closures open and without any auxiliary means of buoyancy. The subject then enters the water feet first and swims or treads water for two minutes, during this period the subject allows water to enter the suit but does not attempt to flood the suit to its capacity. After the two minute period, the subject closes each of the suit closures. The subject must then be able to emerge from the pool onto the platform using only his or her hands on top of the platform as an aid, and without pushing off the bottom of the pool.

(8) *Stability and retro-reflective material.* While wearing a suit in water without any auxiliary means of buoyancy, each subject assumes a face-up position and then allows his or her body to become limp. The distance from the water suface to the lowest part of the subject's mouth or nose is measured. For each test subject, the stable position and the distance of the mouth and nose above water must be as prescribed in § 160.071-11(a)(3). This procedure is repeated using the auxiliary means of buoyancy, if one is provided. For each test subject the stable position and the distance of the mouth and nose above the water must be as prescribed in § 160.071-11(a)(4). During this test, each subject must be viewed by observers at water level from the front and back to determine whether the retroreflective material of the suit meets § 160.071-9(n).

(9) *Righting.* Each subject while wearing a suit in water without any auxiliary means of buoyancy takes a

deep breath, assumes a face-down position, allows his or her body to become limp, and slowly expels air. The suit must cause the subject to turn face up within 10 seconds; or if the suit does not turn the subject within 10 seconds, the subject must be able to turn face up under his or her own power within 5 seconds. The procedure is repeated using the auxiliary means of buoyancy, if one is provided.

(10) *Water and air penetration.* Each subject is weighed while wearing a completely dry suit without any auxiliary means of buoyancy. The subject jumps into water from a height that will cause the subject to be completely immersed. The subject swims or treads water for approximately one minute emerges from the water, and is weighed within 10 seconds after emerging. The procedure is repeated with the subject entering the water headfirst. As the subject enters the water head-first, air that accumulates in the leg must be expelled automatically. At the end of this test, the weight of the subject in the wet suit must not exceed the dry weight of the subject and suit by more than 5 kg (11 lb.).

(11) *Impact.* While wearing a suit without any auxiliary means of buoyancy, each subject jumps into water feet first six times from a height of 3 m (10 ft.) above the water surface. Each subject must be able to assume a face up stable position without assistance after each jump. The suit must not tear, separate at any seam, or exhibit any characteristic that would render it unsafe or unsuitable for use in water.

(d) *Thermal protection.* The thermal protection capability of a suit must be tested under the following conditions and procedures:

(1) *Test subjects.* Male subjects must be used for this test. Each subject must be familiarized with the test procedure before starting the test. Each subject must be between 1.65 m (65 in.) and 1.85 m (73 in.) tall and must not be more than 10 percent overweight or underweight for his height and physical type as determined by a physician or physiologist or from published physiological data. Each subject must have had a normal night's sleep the night before the test, a well-balanced meal 1 to 5 hours before the test, and no alcoholic beverages for 24 hours before the test. In addition to the suit, each subject must wear a tee shirt and shorts, a long sleeved cotton shirt, denim trousers, athletic socks, and oxford type shoes if the suit is designed for shoes to be worn inside.

(2) *Test equipment.* The test must be conducted in calm water with a temperature between 0° C (32° F) and 3° C (37.4° F). The air temperature 300 mm (1 ft.) above the water surface must be between minus 10° C (14° F) and 20° C (68° F). Each subject must be instrumented with an electrocardiograph, a thermistor or thermocouple in the rectum placed 150 mm (6 in) beyond the anus, a thermistor or thermocouple on the tip of the index finger, and a thermistor or thermocouple on the tip of the great toe. Each thermistor or thermocouple must have an accuracy of 0.1° C (.18° F).

(3) *Test procedure.* A physician must be present during this test. Before donning the suit, each subject rests quietly in a room with a temperature between 10° C (50° F) and 25° C (77° F) for 15 minutes. The rectal temperature is then recorded as the initial rectal temperature. The subject dons a suit as rapidly as possible without damaging the instrumentation and immediately enters the water. The subject assumes a face-up, stable floating position. No auxiliary means of buoyancy may be used during this test. The subject remains in the water engaging in activity that maintains the heart rate between 50 and 140 per minute for the first hour, and between 50 to 120 per minute during the remainder of the test, except that no attempt is made to control heart rate if the subject is shivering. Each thermistor or thermocouple reading is recorded at least every 10 minutes.

(4) *Completion of testing.* Testing of a subject ends six hours after he first enters the water, unless terminated sooner.

(5) *Termination of test.* Testing of a subject must be terminated before completion if any of the following occurs:

(i) The physician determines that the subject should not continue.

(ii) The subject requests termination due to discomfort or illness.

(iii) The subject's rectal temperature drops more than 2° C (3.6° F) below the initial rectal temperature, unless the physician determines that the subject may continue.

(iv) The subject's finger or toe temperature drops below 5° C (41° F), unless the physician determines that the subject may continue.

(6) *Test results.* The test results must be prepared as follows:

(i) The total rectal temperature drop during the test period and the average finger and toe temperature at the end of the test must be determined for each subject in the test, except subjects who did not complete testing for a reason stated in paragraph (d)(5)(i) or (d)(5)(ii) of this section. These temperatures and temperature drops must then be averaged. The average drop in rectal temperature must not be more than 2° C (3.6° F), and the average toe and finger temperature must not be less than 5° C (41° F). Data from at least four subjects must be used in making these temperature calculations.

(ii) Rates of toe, finger, and rectal temperature drop for each subject who did not complete testing for a reason stated in paragraph (d)(5)(iii) or (d)(5)(iv) of this section must be determined using the highest temperature measured and the temperature measured immediately before testing was terminated. These rates must be used to extrapolate to 6 hours the estimated rectal, finger, and toe temperature at the end of that time. These estimated temperatures must be the temperatures used in computing the average temperatures described in paragraph (d)(6)(i) of this section.

(e) *Insulation.* Suit material must be tested under the following conditions and procedures, except that if the suit material meets the requirements for the control sample in paragraph (e)(1)(iii) of this section, the test procedure in paragraph (e)(2) of this section is not required:

(1) *Test equipment.* The following equipment is required for this test:

(i) A sealed copper or aluminum can that has at least two parallel flat surfaces and that contains at least two liters (two quarts) of water and no air. One possible configuration of the can is shown in Figure 160.071-17(e)(1)(i).

(ii) A thermistor or a thermocouple that has an accuracy of ±0.1°C (0.18°F) and that is arranged to measure the temperature of the water in the can.

(iii) A control sample of two flat pieces of 4.75 mm (3/16 in.) thick, closed-cell neoprene foam of sufficient size to enclose the can between them. The control sample must have a thermal conductivity of not more than 0.050 watt/meter-°K (0.346 Btu-in./hr.-sq.ft.-°F). The thermal conductivity of the control sample must be determined in accordance with the procedures in ASTM C 177 or ASTM c 518.

(iv) Two flat pieces of suit material of sufficient size to enclose the can between them. The surface covering, surface treatment, and number of layers of the material tested must be the same as those of material used in suit. If the material used in the suit varies in thickness or number of layers, the material tested must be representative of the portion of the suit having the least thickness or number of layers.

(v) A clamping arrangement to form a watertight seal around the edges of the material when the can is enclosed inside. A sealing compound may be used. Figure 160.071-17(e)(1)(v) shows one possible configuration of the clamping arrangement.

(vi) A container of water deep enough to hold the entire assembly of the can, material, and clamp at least 1 m (39 in.) below the surface of the water.

(vii) A means to control the temperature of the water in the container between 0°C (32°F) and 1°C (33.8°F).

(viii) A thermistor or thermocouple that has an accuracy of ±0.1°C (0.18°F) and that is arranged to measure the temperature of the water in the container at the depth at which the can material, and clamp are held.

(2) *Test Procedure.* The can is held under water (which can be at room temperature) and clamped between the two pieces of the neoprene control sample so that the assembly formed conforms as closely as possible to the shape of the can, and so that water fills all void spaces between the can

and the sample. When the water temperature in the can is at or above 45°C (113°F), the assembly is then placed in the container and submerged to a depth of 1 m (39 in.) at the highest point of the assembly. The water temperature in the container must be between 0°C (32°F) and 1°C (33.8°F) and must be maintained within this temperature range for the remainder of the test. No part of the assembly may touch the bottom or sides of the container. Every two minutes the assembly is shaken and then inverted from its previous position. The time for the water inside the can to drop from 45°C to 33°C (91°F) is recorded. This procedure is performed three time and then repeated three additional times using the suit material instead of the neoprene control sample. The shortest time for the drop in water temperature when the suit material is used must be greater than or equal to the shortest time when the neoprene control sample is used.

(f) *Storage temperature.* A suit in its storage case is placed in a chamber with a temperature of 60°C±3°C (140°±5.4°F) for 24 hours. A test subject then enters the chamber and dons the suit. This procedure is repeated at a temperature of minus 20°C (minus 4°F),±3°C. The subject may wear protective clothing for this test. Under each condition, the subject must be able to don the suit without damaging it.

(g) *Measured buoyancy.* The buoyancy of a suit must be measured under the following conditions and procedures:

(1) *Test equipment.* The following equipment is required for this test:

(i) A mesh basket that is large enough to hold a folded suit, and that is weighted sufficiently to overcome the buoyancy of the suit when placed in the basket.

(ii) A tank of water that is large enough to contain the basket submerged with its top edge 50 mm (2 in.) below the surface of the water.

(iii) A scale of load cell that has an accuracy of 0.15 N (½ oz.) and that is arranged to support and weigh the basket in the tank.

(2) *Test procedure.* The basket is submerged so that its top edge is 50 mm (2 in.) below the surface of the water. The basket is then weighed. Thereafter, a suit is submerged in water and then filled with water, folded, and placed in the submerged basket. The basket is tilted 45° from the vertical for five minutes in each of four different directions to allow all entrapped air to escape. The basket is then suspended with its top edge 50 mm (2 in.) below the surface of the water for 24 hours. At the end of this period, the basket and suit are weighed underwater. The measured buoyancy of the suit is the difference between this weight and the weight of the basket as determined at the beginning of the test. The measured buoyancy is used to determine adjusted buoyancy as described in paragraph (h) of this section.

(h) *Adjusted buoyancy.* The adjusted buoyancy of a suit is its measured buoyancy reduced by the percentage buoyancy loss factor of the buoyant suit material. The percentage buoyancy loss factor is part of the buoyancy rating code determined in accordance with UL 1191, except that the minimum number of samples required to determine each property is 10 instead of 75.

(i) *Suit flame exposure.* The suit's resistance to flame must be tested under the following conditions and procedures:

(1) *Test equipment.* The following equipment is required for this test:

(i) A metal pan that is at least 300 mm (12 in.) wide, 450 mm (18 in.) long, and 60 mm (2½ in.) deep. The pan must have at least 12 mm (½ in.) of water on the bottom with approximately 40 mm (1½ in.) of gasoline floating on top of the water.

(ii) An arrangement to hold the suit over the gasoline.

(2) *Test procedure.* A suit is held from its top by the holding arrangement. The gasoline is ignited and allowed to burn for approximately 30 seconds in a draft-free location. The suit is then held with the lowest part of each foot 240 mm (9.5 in.) above the surface of the burning gasoline. After two seconds, measured from the moment the flame first contacts the suit, the suit is removed from the fire. If the suit is burning, it is allowed to

continue to burn for six seconds before the flames are extinguished. If the suits sustains any visible damage other than scorching, it must then be subjected to the stability test described in paragraph (c)(8) of this section, except that only one subject need be used, the impact test described in paragraph (c)(11) of this section, except that only one subject need be used, the thermal protection test described in paragraph (d) of this section, and the buoyancy test described in paragraph (g) of this section, except that the buoyancy test need be conducted only for 2 hours.

(j) *Storage case flame exposure.* The storage case must be tested using the same equipment required for the suit flame exposure test. The exposure suit must be inside the storage case for this test. The storage case is held from its top by the holding arrangement. The gasoline is ignited and allowed to burn for approximately 30 seconds in a draft-free location. The storage case is then held with its lowest part 240 mm (9.5 in.) above the surface of the burning gasoline. After two seconds, measured from the moment the flames first contact the case, the case is removed from the fire. If the case is burning, it is allowed to continue to burn for six seconds before the flames are extinguished. The storage case material must not burn through at any point in this test and the exposure suit must not sustain any visible damage.

(k) *Corrosion resistance.* Each metal part of a suit that is not 410 stainless steel, or for which published evidence of salt-spray corrosion resistance equal to or greater than 410 stainless steel is not available, must be tested as described in ASTM B 117. A sample of each metal under test and a sample of 410 stainless steel must be tested for 720 hours. At the conclusion of the test, each sample of test metal must show corrosion resistance equal to or better than the sample of 410 stainless steel.

(l) *Body strength.* The body strength of a suit must be tested under the following conditions and procedures:

(1) *Test equipment.* The test apparatus shown in Figure 160.071-17(l)(1) must be used in this test. This apparatus consists of—

(i) Two rigid cylinders each 125 mm (5 in.) in diameter, with an eye or ring at each end;

(ii) A weight of 135 kg (300 lb.); and

(iii) Ropes or cables of sufficient length to allow the suit to be suspended as shown in Figure 160.071-17(l)(1).

(2) *Test procedure.* The suit is cut at the waist and wrists, or holes are cut into it as necessary to accommodate the test apparatus. The suit is immersed in water for at least two minutes. The suit is then removed from the water and immediately arranged on the test apparatus, using each closure as it would be used by a person wearing the suit. The 135 kg (300 lb.) load is applied for 5 minutes. No part of the suit may tear or break during this test. The suit must not be damaged in any way that would allow water to enter or that would affect the performance of the suit.

(m) *Seam strength.* The strength of each different type of seam used in a suit must be tested under the following conditions and procedures:

(1) *Test equipment.* The following equipment must be used in this test:

(i) A chamber in which air temperature can be kept at 23° C. (73.4° F)±2° C (1.8° F) and in which relative humidity can be kept at 50%±5%.

(ii) A device to apply tension to the seam by means of a pair of top jaws and a pair of bottom jaws. Each set of jaws must grip the material on both sides so that it does not slip when the load is applied. Each jaw must be 25mm (1 in.) wide by 25mm (1 in.) long. The distance between the jaws before the load is applied must be 75mm (3 in.).

(2) *Test samples.* Each test sample must consist of two pieces of suit material, each of which is a 100mm (4 in.) square. The two pieces are joined by a seam as shown in figure 160.071-17(m)(3). For each type of seam, 5 samples are required. Each sample

may be cut from the suit or may be prepared specifically for this test. One type of seam is distinguished from another by the type and size of stitch or other joining method used and by the type and thickness of the materials joined at the seam.

(3) *Test procedure.* Each sample is conditioned for at least 40 hours at 23° C±2° C and 50%±5% relative humidity. Immediately after conditioning, each sample is mounted individually in the tension device as shown in figure 160.071-17(m)(3). The jaws are separated at a rate of 5mm/second (12 in./minute). The force at rupture is recorded. The average force at rupture must be at least 225 N (50 lb.).

(n) *Tear resistance.* The tear resistance of suit material must be determined by the method described in ASTM D 1004. If more than one material is used, each material must be tested. If varying thicknesses of a material are used in the suit, samples representing the thinnest portion of the material must be tested. If multiple layers of a material are used in the suit, samples representing the layer on the exterior of the suit must be tested. Any material which is a composite formed of two or more materials bonded together is considered to be a single material. The average tearing strength of each material must be at least 45 N (10 lb.).

(o) *Abrasion resistance.* The abrasion resistance of each type of suit material on the exterior of the suit must be determined by the method described in Federal Test Method Standard 191, Method 5304.1. If varying thicknesses of exterior suit material are used, samples representing the thinnest portion of the material must be tested. If exterior material has multiple layers, samples of the layer on the outside surface of the suit must be tested. Any exterior material which is a composite formed of two or more materials bonded together is considered to be a single material and the abradant must be applied to the surface that is on the exterior of the suit. The residual breaking strength of each material must be at least 225 N (50 lb.).

[CGD 76-033a, 45 FR 24478, Apr. 10, 1980, as amended by 46 FR 23428, Apr. 27, 1981]

§ 160.071-19 Approval testing for child size exposure suit.

A child size suit must pass the following tests:

(a) The stability test prescribed in § 160.071-17(c)(8), except that only six children need be used as test subjects and they can be either sex. The subjects must be within the ranges of weight and height prescribed in § 160.071-9(m). The heaviest subject must weigh at least 10 kg (22 lb.) more than the lightest subject.

(b) The buoyancy test prescribed in § 160.071-17(g).

(c) The body strength test prescribed in § 160.071-17(k), except that the cylinders must be 50mm (2 in.) in diameter and the test weight must be 55 kg (120 lb.).

§ 160.071-23 Marking.

(a) Each suit must be marked with the name of the manufacturer, the date of manufacture, the model, the size, and the Coast Guard approval number.

(b) Each storage case must be marked with the words "exposure suit" and the size.

(c) The size markings for the child size exposure suits required under paragraphs (a) and (b) of this section must also include the following statement in print smaller than the word "CHILD": "(SMALL ADULT UNDER 50 kg (110 lb.))".

§ 160.071-25 Production testing.

(a) Exposure suit production testing is conducted under the procedures in this section and Subpart 159.007 of this chapter.

(b) One out of every 100 exposure suits produced must be tested as prescribed in § 160.071-17(g) and must be given a complete visual examination. The suit must be selected at random from a production lot of 100 suits and tested by, or under the supervision of, an independent laboratory.

(c) If the suit fails to pass the test prescribed in § 160.071-17(g), 10 additional suits from the same lot must be selected at random and subjected to the test. If a defect in the suit is detected upon visual examination, 10 additional suits from the same lot must be selected at random and examined for the defect.

(d) If one or more of the 10 suits fails to pass the test or examination, each suit in the lot must be tested or examined for the defect for which the lot was rejected. Only suits that pass the test or that are free of defects may be sold as Coast Guard approved.

(e) The manufacturer must ensure that the quality control procedure described in the test plans previously submitted for approval under § 160.071-7 (f) and (g) is followed.

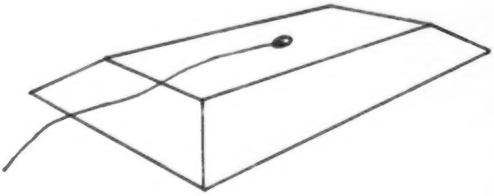


Figure 160.071(e)(1)(i). Water pan for insulation test shown with thermistor lead.

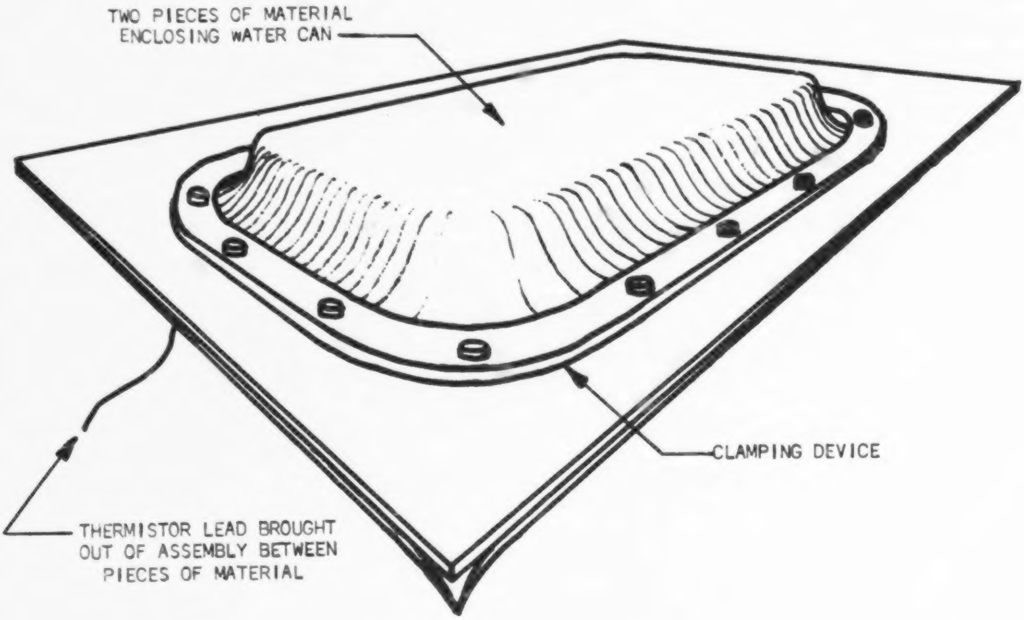

TWO PIECES OF MATERIAL ENCLOSING WATER CAN
CLAMPING DEVICE
THERMISTOR LEAD BROUGHT OUT OF ASSEMBLY BETWEEN PIECES OF MATERIAL

Figure 160.071-17(e)(1)(v). Insulation test assembly.

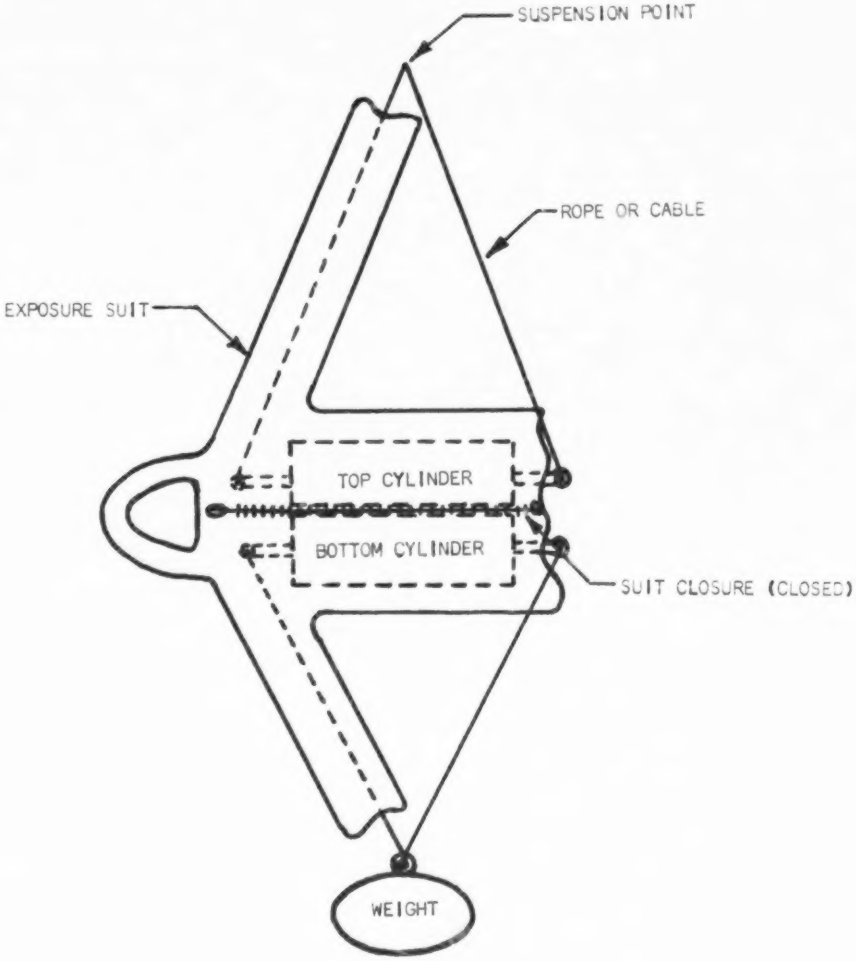

SUSPENSION POINT
ROPE OR CABLE
EXPOSURE SUIT
TOP CYLINDER
BOTTOM CYLINDER
SUIT CLOSURE (CLOSED)
WEIGHT

Figure 160.071-17(j)(1). Body strength test apparatus.

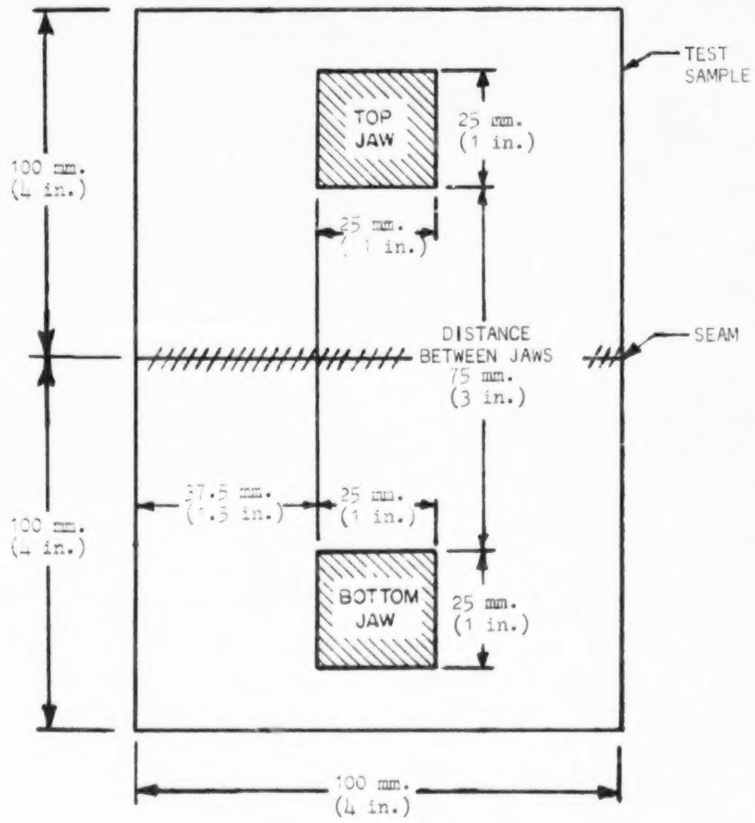

TEST SAMPLE
TOP JAW
25 mm. (1 in.)
100 mm. (4 in.)
25 mm. (1 in.)
DISTANCE BETWEEN JAWS 75 mm. (3 in.)
SEAM
37.5 mm. (1.5 in.)
25 mm. (1 in.)
100 mm. (4 in.)
BOTTOM JAW
25 mm. (1 in.)
100 mm. (4 in.)

Figure 160.071-17(k)(3). Method of mounting sample for seam strength test.

Subpart 160.072—Distress Signals for Boats, Orange Flag

AUTHORITY: Section 5, 85 Stat. 215 as amended, 46 U.S.C. 1454; 49 CFR 1.46(n)(1).

SOURCE: CGD 76-183a, 44 FR 73054, Dec. 17, 1979, unless otherwise noted.

§ 160.072-1 Applicability.

(a) This subpart establishes standards for distress flags for boats.

§ 160.072-3 General performance requirements.

(a) Each flag must:

(1) Be a square or rectangle at least 90 cm (36 inches) wide and at least 90 cm (36 inches) long. If the flag is a rectangle, the shorter side cannot be less than ⅔ the length of the longer side;

(2) Have no less than 70% of the total area colored a bright red-orange color;

(3) Display a black disc and a black square on the red-orange background on both sides arranged as follows:

(i) The diameter of the disc and the length of one side of the square shall be equal, and shall each be ⅓ of the length of the longest side of the flag, or 30 cm (12 inches), whichever is greater.

(ii) The disc and square must be centered on one axis of the flag parallel to the longest side of the flag as shown in Figure 160.072-3. If the flag is a square, the axis may be parallel to any side.

(iii) The disc and square shall be separated by a distance of ⅙ the length of the longest side of the flag or 15 cm (6 inches), whichever is greater.

(4) Be capable of passing the accelerated weathering test of § 160.072-5;

(5) Have reinforced corners, each with a grommet; and,

(6) Be packaged with 4 pieces of line, with a tensile strength of at least 225 N (Newtons) (50 lbs) no less than 30 cm (12 inches) long, capable of passing through the grommets freely.

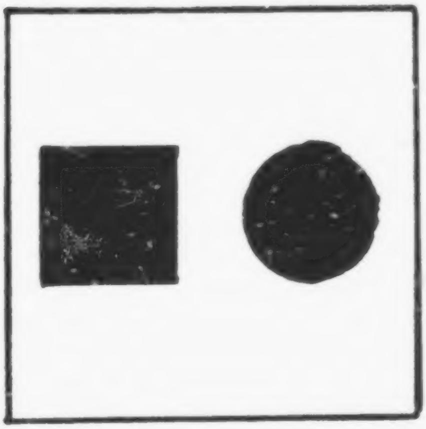


FIGURE 160.072-3

§ 160.072-5 Accelerated weathering test.

(a) Condition the flag, folded to 1/16th its size or as packaged, whichever is smaller, by submersion in 5% by weight sodium chloride solution for 2 hours followed immediately by storage at 95% (±5) related humidity and 40°C (±3°) (100°F ±5°) for at least 15 days.

(b) Unfold and suspend flag by the lines provided, secured through each grommet.

(c) Subject the flag to alternate 3 minute cycles of 5% by weight sodium chloride solution at 55 degrees (±5°) C and air blasts of 40 knots at 55 degrees (±5°) C, perpendicular to and over the entire surface of one side of the flag, without interruption for a period of not less than 24 hours.

(d) The flag fails the accelerated weathering test if

(1) After conditioning, the flag cannot be unfolded without damage,

(2) There is any tearing,

(3) The flag does not retain its bright red/orange color,

(4) The disc and square images no longer meet the requirements of § 160.072-3(a)(3) or,

(5) There is any visible rot over more than 3% of the flag's surface.

§ 160.072-7 Manufacturer certification and labeling.

(a) Each distress flag intended as a Day Visual Distress Signal required by 33 CFR Part 175 must be certified by the manufacturer as complying with the requirements of this subpart.

(b) Each distress flag must be legibly and indelibly marked with:

(1) The manufacturer's name; and

(2) The following words—

"Day Visual Distress Signal for Boats. Complies with U.S. Coast Guard Requirements in 46 CFR 160.072. For Emergency Use Only".

§ 160.072-09 Manufacturer notification.

(a) Each manufacturer certifying flags in accordance with the specifications of this subpart must send written notice to the Commandant (G-BBT/TP42), U.S. Coast Guard, Washington, D.C. 20591—

(1) Within 30 days after first certifying a flag,

(2) Every five years as long as the manufacturer continues to produce flags, and

(3) Each time the design or construction material of the flag changes.

PART 161—ELECTRICAL EQUIPMENT

Subpart 161.001 [Reserved]

Subpart 161.002—Fire-Protective Systems

Sec.
161.002-1 Applicable specifications, standards, and regulations.
161.002-2 Types of fire-protective systems.
161.002-3 Materials and workmanship.
161.002-4 General requirements.
161.002-5 General design requirements (mechanical).
161.002-6 General design requirements (electrical).
161.002-7 Electrical component parts.
161.002-8 Automatic fire detecting systems, general requirements.
161.002-9 Automatic fire detecting system, power supply.
161.002-10 Automatic fire detecting system control unit.
161.002-11 Fire detecting thermostat.
161.002-12 Manual fire alarm systems.
161.002-13 Manual fire alarm boxes.
161.002-14 Watchman's supervisory systems.
161.002-15 Smoke detecting systems.
161.002-16 Methods of sampling, inspection and testing.
161.002-17 Equivalents.

Subpart 161.004—Emergency Loudspeaker System

Sec.
161.004-1 Applicable specifications and other publications.
161.004-2 Type.
161.004-3 Materials and workmanship.
161.004-4 Requirements.
161.004-5 Tests.
161.004-6 Marking.
161.004-7 Procedure for approval.

Subpart 161.006—Searchlights, Motor Lifeboat, for Merchant Vessels

161.006-1 Applicable specifications.
161.006-2 Type.
161.006-3 Materials and workmanship.
161.006-4 Requirements.
161.006-5 Sampling, inspections and tests.
161.006-6 Procedure for approval.

Subpart 161.008—Flashlights, Electric, Hand, for Merchant Vessels

161.008-1 Applicable specifications.
161.008-2 Sizes.
161.008-3 Materials and workmanship.
161.008-4 General requirements.
161.008-5 Detail requirements.
161.008-6 Inspection and methods of test.
161.008-7 Marking.
161.008-8 Procedure for approval.

Subpart 161.010—Floating Electric Water Light

161.010-1 Applicable specifications.
161.010-2 Type.
161.010-3 Materials.
161.010-4 Construction and performance.
161.010-5 Inspection and methods of test.
161.010-6 Marking.
161.010-7 Procedure for approval.

Subpart 161.011—Emergency Position Indicating Radiobeacons

161.011-1 Purpose.
161.011-5 Classes.
161.011-10 EPIRB approval.

Subpart 161.012—Personal Flotation Device Lights

161.012-1 Scope.
161.012-3 Definitions.
161.012-5 Approval procedures.
161.012-7 Construction.
161.012-9 Performance.
161.012-11 Approval tests.
161.012-13 Production tests and inspections.
161.012-15 Markings.
161.012-17 Instructions.

Subpart 161.013—Electric Distress Light for Boats

Sec.

161.013-1 Applicability.
161.013-3 General performance requirements.
161.013-5 Intensity requirements.
161.013-7 Signal requirements.
161.013-9 Independent power source.
161.013-11 Prototype test.
161.013-13 Manufacturer certification and labeling.
161.013-17 Manufacturer notification.

AUTHORITY: R.S. 4405, as amended, 4462, as amended; 46 U.S.C. 375, 416. Interpret or apply R.S. 4399, as amended, 4400, as amended, 4417, as amended, 4417a, as amended, 4418, as amended, 4421, as amended, 4426, as amended, 4427, as amended, 4433, as amended, 4453, as amended, 4488, as amended, 4491, as amended, sec. 14, 29 Stat. 690, as amended, sec. 10, 35 Stat. 428, as amended, 41 Stat. 305, as amended, sec. 5, 49 Stat. 1384, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, sec. 17, 54 Stat. 166, as amended, sec. 3, 54 Stat. 347, as amended, sec. 3, 70 Stat. 152, sec. 3, 68 Stat. 675; 46 U.S.C. 361, 362, 391, 391a, 392, 399, 404, 405, 411, 435, 481, 489, 366, 395, 363, 369, 367, 526p, 1333, 390b, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-20, June 18, 1956, 21 FR 4894; CGFR 56-28, July 24, 1956, 21 FR 5659; 167-38, Oct. 26, 1959, 24 FR 8857, unless otherwise noted.

Subpart 161.001 [Reserved]

Subpart 161.002—Fire-Protective Systems

SOURCE: 21 FR 9032, Nov. 21, 1956, unless otherwise noted.

§ 161.002-1 Applicable specifications, standards, and regulations.

(a) The following specifications, standards, and regulations, of the issue in effect on the date the fire-protective systems are manufactured, form a part of this subpart:

(1) National Bureau of Standards publication:

Handbook H28—Screw-Thread Standards for Federal Services (including supplement)

(2) Military specifications:

MIL-W-16878A (Navy)—Wire, Electrical (Insulated, High Temperature).

(3) A. S. T. M. Standard:

B117—Method of Salt Spray (Fog) Testing (Tentative).

(4) Coast Guard regulations:

Electrical Engineering Regulations, CG-259 (46 CFR (Subchapter J) Parts 110 to 113 inclusive).

(b) Copies of the specifications standards, and regulations referred to in this section shall be kept on file by the manufacturer, together with the certificate of approval.

(c) The National Bureau of Standards publications may be purchased from the Superintendent of Documents, U. S. Government Printing Office, Washington, D.C. 20402. The military specifications may be obtained from the Bureau of Supplies and Accounts, Department of the Navy, Washington, D.C. 20350. The Coast Guard publications may be obtained from the Commandant, U.S. Coast Guard Headquarters, Washington, D.C. 20226. The A. S. T. M. specifications may be purchased from the American Society for Testing Materials, 1916 Race Street, Philadelphia, Pa. 19103.

§ 161.002-2 Types of fire-protective systems.

(a) *General.* Fire-protective systems covered by this subpart shall include, but not be limited to, automatic fire detecting systems, manual fire alarm systems, smoke detector systems, watchman's supervisory systems, and combinations of these systems.

(b) *Automatic fire detecting systems.* For the purpose of this subpart, automatic fire detecting systems will be considered to consist of normal and emergency power supplies, a fire detecting control unit, fire detectors, and vibrating bells.

(c) *Manual fire alarm systems.* For the purpose of this Subpart, manual fire alarm systems will be considered to consist of normal and emergency power supplies, a fire alarm control unit, manual fire alarm boxes, and vibrating bells. Manual fire alarm systems are usually combined with automatic fire detecting systems.

(d) *Smoke detector systems.* For the purpose of this subpart, smoke detector systems will be considered to consist of a control unit, a blower box, and a piping system to conduct air samples from the protected spaces to the control unit.

(e) *Watchman's supervisory systems.* For the purpose of this subpart, a watchman's supervisory equipment will be considered to be apparatus, either electrical or mechanical, used to verify the presence of watchmen and the regular performance of their assigned duties.

[CGFR 56-39, 21 FR 9032, Nov. 21, 1956, as amended by CGFR 70-143, 35 FR 19966, Dec. 30, 1970]

§ 161.002-3 Materials and workmanship.

(a) *Suitability.* All materials used in the construction of fire-protective equipment shall be of the quality best suited for the purpose intended.

(b) *Materials covered by reference specifications.* Where specifications are referred to for a given material, it is intended to require that the quality of material used shall be at least equal to that covered in the reference specifications.

(c) *Departures from reference specifications.* The use of materials not conforming with or not covered by the reference specifications shall be noted on the plans specified in § 161.002-16(d)(1) and will be the subject of specific approval.

(d) *Protection against corrosion*—(1) *General.* In order to prevent deterioration due to corrosion, all fastenings, fittings, brackets, and other metallic parts shall be of an approved corrosion-resistant material or of a material treated in an approved manner to render it adequately resistant to corrosion. Screws, bolts, nuts, and other threaded parts, except those in contact with aluminum, shall be of brass, or other approved corrosion, resistant material. The material of parts in contact with aluminum shall be compatible therewith and otherwise comply with the requirements of this paragraph.

(2) *Corrosion-resistant materials.* Silver, copper, brass, bronze, phosphor-bronze, beryllium-copper alloys, copper-nickel alloys and nickel-copper alloys, certain aluminum alloys, and certain stainless steel alloys are considered satisfactory corrosion-resistant materials within the intent of this paragraph.

(3) *Corrosion-resisting treatment.* Sherardizing, anodic treatment of aluminum, zinc chromate base paint finish, and plating, when properly done and of sufficiently heavy coat, are considered satisfactory corrosion-resistant treatments. Other corrosion-resistant treatments shall be subject to specific approval.

(4) *Dissimilar metals.* In order to minimize the corrosive effect due to electrolytic action between dissimilar metals, contact between dissimilar metals shall be limited to those metals having small difference of electrolytic potential in the electrochemical series.

(5) *Iron and steel parts.* The surfaces of all iron and steel parts, except bearings, etc., where such protection is impracticable, shall be suitably protected against corrosion by a satisfactory corrosion-resistant treatment.

(e) *Workmanship.* The workmanship shall be first class in every respect.

§ 161.002-4 General requirements.

(a) *Introduction.* The purpose of fire-protective systems is to give warning of the presence of fire in the protected spaces. To meet this end, the basic requirements of the fire-protective systems are reliability, sturdiness, simplicity of design, ease of servicing, and the ability to withstand shipboard shock and vibration and the adverse effects of sea humidity.

§ 161.002-5 General design requirements (mechanical).

(a) *Bulkhead mounting.* Enclosures designed for bulkhead mounting may be of either the surface or the flush type.

(b) *Ceiling mounting.* Enclosures designed for ceiling mounting may be of either the surface or the flush type.

(c) *Servicing.* All enclosures shall be designed to facilitate servicing the equipment contained therein.

(d) *Minimum metal thickness.* Units shall be so formed and assembled that they will have the strength and rigidity necessary to resist the abuse to which they are liable to be subjected without affecting adversely their performance. The wall thickness of metal enclosures shall be not less than the minimum values given in Tables 161.002-5(d)(1) and 161.002-5(d)(2).

TABLE 161.002-5(d)(1)

Use, or dimensions, of area involved	Minimum thickness of cast metal in inch
Area of 24 square inches or less and having no dimensions greater than six inches	1/8
Area greater than 24 square inches or having any dimension greater than six inches	3/16
At a threaded cable entrance opening	1/4

TABLE 161.002-5(d)(2)

Maximum unsupported area of flat surface in square inches	Minimum thickness of metal	
	U.S.S. gage number of sheet steel	AWG number of nonferrous metal
360	16	14
1,200	14	12
1,500	12	10
Over 1,500	10	8

(e) *Bolts, nuts, screws, and threads.* All bolts, nuts, screws and threaded parts shall comply with the following requirements:

(1) All threaded parts shall be of American National Form in accordance with the Screw Thread Standards for Federal Services, Handbook H-28, listed in § 161.002-1.

(2) All threaded parts used for adjustment purposes or for securing complete component items to the supporting structure of any unit shall, where possible, conform to the National Coarse or Fine Thread series.

(3) All tapped holes in metal shall have not less than two full threads in the metal.

(f) *Locking devices.* Lockwashers, or other means, shall be provided for securing threaded connections, and shall be employed under screw heads or nuts used for securing electrical connections.

(g) *Marking.* (1) All units requiring manipulation or adjustment by the operator shall be provided with permanent name plates as necessary to assure proper operation and/or adjustment of the equipment in service. The purpose of each switch, pilot light, relay drop, reset device, rheostat, etc., shall be clearly indicated.

(2) Each complete item of equipment approved shall have affixed a permanent name plate giving the name of manufacturer, Coast Guard approval number assigned to the equipment, and the model or type designation or other identification.

§ 161.002-6 General design requirements (electrical).

(a) *Wiring*—(1) *Hook-up wire.* The individual conductors used in wiring of equipment covered by the specification shall be of standard construction and shall be of one of the standard types listed in Table 161.002-6(a)(1) unless otherwise approved. Conductors shall have adequate mechanical strength and current-carrying capacity for the service.

TABLE 161.002-6(a)(1)

Type	Applicable specification
AF, SF-2, SFF-2, RF-2, FF-2, RFH-2, FFH-2, TF, and TFF.	Electrical Engineering Regulations (46 CFR, Parts 110 to 113, inclusive).
B, C, D, E, EE, and FF	Military Specification MIL-W-16878A (Navy).

(2) *Lacing.* Whenever practicable, groups of two or more conductors shall be bundled and laced. Lacing shall not be tight enough to cause distortion of the conductor insulation.

(3) *Sleevings or tape.* All cable forms connecting between a fixed and a movable portion of an assembly shall be provided with sufficient slack and shall be covered with a protective sleeving or tape (of fire retardant, non-hygroscopic material) to eliminate the possibility of chafing or mechanical abrasion on the surface of individual conductors.

(4) *Cable clamps.* Cable clamps shall be provided at frequent intervals along the length of all cable forms to secure cable runs against vibration or undue movement. Such clamps shall be adequately cushioned to prevent damage to conductor insulation.

(5) *Bushings.* Suitable smoothly-rounded bushings shall be used in holes in sheet metal through which

cable forms or conductors pass. Holes in other materials shall be smoothly-rounded if not bushed.

(6) *Wire terminals.* Wire ends connected to screws or threaded stud type terminals shall be terminated in suitable closed-end terminals of either the solderless or the solder type.

(b) *Terminal boards*—(1) *External connections.* Terminal boards shall be provided for all external connections to an item of equipment.

(2) *Ships' cables.* Terminal boards for receiving ships' cable shall be secured to a fixed portion of an item of equipment and not to hinged panels or other movable members, which would require flexing of ships' wiring during normal operation or maintenance.

(3) *Marking.* All terminal boards shall be marked in a clear and permanent manner to show the designation of each terminal in accordance with markings assigned by the equipment wiring diagram.

(c) *Soldering of terminal parts*—(1) *General.* All soldering shall be effected in a neat and workmanlike manner.

(2) *Strength of soldered joint.* In general, soldering alone shall not be depended upon for a satisfactory connection, but where wires and terminals are joined to be soldered, the wires shall be hooked, wrapped around or otherwise mechanically secured to the terminals prior to soldering.

(3) *Soldering flux.* Only pure resin or a mixture of alcohol and resin (or equivalent) shall be used as a flux.

(d) *Temperature rise.* The temperature rise of any part of the equipment shall not exceed the values given in Table 161.002-6(d)(1) when operated in its intended manner at rated voltage in an ambient temperature of 25°C.

TABLE 161.002–6(d)(1)

Material	Maximum temperature rise
Any point on a copper-oxide rectifier.	30°C.
On rubber or thermoplastic insulation.	35°C.
Any point on a selenium rectifier	50°C.
On asbestos-varnished-cambric or varnished cambric insulation.	55°C.
At any point on or within a terminal box or compartment.	55°C.
On fuses	55°C.
On fiber employed as electrical insulation.	55°C.
On Class A insulation	55°C.
On a transformer enclosure	55°C.
On Class B insulation	80°C.
On phenolic composition employed as electrical insulation.	125°C.
Sealing compound [1]	15°C. less than softening point.[2]
Capacitor, resistor, electronic tube, lamps.	10°C. less than the temperature limit of the device.

[1] Also see § 161.002-11(h)(3).

[2] These are limiting temperatures, not temperature rises.

(e) *Coils.* All coils of electro-magnetic devices such as relays, bells and motors shall be insulated and impregnated to withstand combinations of heat, oil or moisture that may be encountered in service.

(f) *Spacings.* Units shall provide reliably maintained spacings between uninsulated live parts, and between uninsulated live parts and non-electrical metal parts. The spacings between any uninsulated live parts and (1) walls and cover of a metal enclosure, (2) fittings for cable entrance, and (3) metal pieces attached to a metal enclosure where deformation of the enclosure is liable to reduce spacings, shall not be less than those indicated in Table 161.002-6(f)(1). The spacings between any uninsulated live parts and (1) an uninsulated live part of opposite polarity, (2) an uninsulated grounded part other than the enclosure, (3) an exposed metal part which is insulated, and (4) uninsulated live parts of the same polarity where a short-circuit would prevent normal signalling operation of the control unit without producing a trouble signal shall be not less than those indicated in Table 161.002-6(f)(2). The spacings within snap switches, lamp-holders, and similar wiring devices shall comply with the requirements of the appropriate standards for such devices.

TABLE 161.002-6(f)(1)

Application: 300 volts or less	Minimum spacing in inch; through air and over surface
Sheet-metal enclosures	1/2
Cast-metal enclosures	1/4

TABLE 161.002-6(f)(2)

	Application	Minimum spacing in inch	
		0–150 volts	151–300 volts
Installation wiring terminals.	Through air	1/4	1/4
	Over surface	1/4	3/8
Other parts [1]	Through air	1/8	1/4
	Over surface	1/4	3/8

[1] At fixed parts of rigidly clamped special assemblies of live parts and insulating separators, such as contact springs on relays, cam switches, etc., which are wired at the factory, the spacings may be less than those indicated in the table for parts other than installation-wiring terminals, but not less than 1/16 inch for 150 volts or less, and not less than 3/32 inch for 151 to 300 volts, through air and over surface.

(g) *Dielectric and insulation resistance characteristics*—(1) *Dielectric strength.* All electrical circuits shall be capable of withstanding continuously for one minute a dielectric test of 60-cycle alternating potential at a R. M. S. value of twice rated voltage plus 1,000 volts between electrical circuits and between circuits and ground, except that for circuits operating at less than 50 volts, the test potential may be 500 volts.

(i) During the performance of the test described above, motors rated at ½ horsepower or less and 250 volts or less shall be disconnected from other circuits of the control unit and shall be tested separately by the application for one minute of a 60-cycle alternating potential of 900 volts, between the frame and the winding or windings of the motor.

(ii) Compliance of a control unit with the requirements of this subparagraph is to be determined by means of a suitable testing transformer, the output voltage of which can be regulated. The test equipment is to have means for indicating breakdown of parts tested.

(2) *Insulation resistance.* The insulation resistance of electrical circuits following the dielectric strength test shall not be less than 10 megohms at 500 volts d.c. and at room temperature.

(h) *Serviceability.* Component enclosures shall be constructed with a view toward maximum accessibility for repair and replacement of assemblies and parts. Parts and assemblies shall be so mounted as to permit replacement of those likely to become defective, without extensive disassembly of other parts and assemblies in the enclosure.

(i) *Insulating material.* Material for the mounting of uninsulated live-metal parts shall be phenolic composition, cold-molded composition, or other material which is recognized as suitable for the particular application. Hard fiber may be used for insulating bushings, washers, separators, and barriers, but not as the sole support for uninsulated live-metal parts where shrinkage, current leakage, or warpage may introduce a hazard. Small molded parts shall be so constructed that they will have adequate mechanical strength and rigidity to withstand the stresses of actual service.

(j) *Current-carrying parts.* Current-carrying parts shall have adequate mechanical strength and current-carrying capacity for the service, and shall be of metal which is recognized as suitable for the particular application. The suitability of a metal other than silver, copper, or copper alloy for current-carrying parts shall be made the subject of a special investigation.

§ 161.002-7 Electrical component parts.

(a) *General.* Relays, bells, buzzers, resistors, lamps, lampholders, lamp indicators, capacitors, terminal connectors, terminal boards, fuses and switches shall be in accordance with this section and with the reference specifications.

(b) *Relays and annunciator drops and other electro-magnetic devices*—(1) *General.* Units shall operate satisfactorily, shall make firm, low resistance contact, and shall retain their setting in any position of the equipment and under any service condition.

The contacts shall be non-corrosive and, where practicable, of the self-wiping type. Relays shall preferably be protected by removable dust covers or hermetically sealed.

(2) *Coils.* All coils shall be suitably insulated and impregnated with a water resistant insulating material.

(3) *Current-interrupting devices.* (i) A current-interrupting device supplied as part of the control unit shall be capable of performing acceptably when subject to an overload test consisting of fifty operations of making and breaking a circuit of rated frequency, and under the conditions indicated in this subparagraph, at a rate representing normal operation. There shall be no electrical or mechanical failure of the device, or undue burning, pitting, or welding of contacts.

(ii) A current-interrupting device intended to control devices which are connected to the load side of the control-unit supply terminals shall be tested with the overload resulting from operation at 115 percent of the rated voltage. Rated voltage for test purposes for a control unit designed to be energized from the ships' emergency lighting and power system is considered to be 118 volts if the marked rating of the control unit is within the range of from 110 to 125 volts or 236 volts if the marked rating of the control unit is within the range of from 220 to 250 volts.

(iii) For a control unit intended to be energized from a cycle-charged, lead-acid type storage battery supply circuit, the rated voltage for testing purposes is 2.0 volts per cell.

(iv) A current-interrupting device intended to control devices which are not connected to the load side of the control unit supply terminals shall be tested with a current of 150 percent of its rated current.

(v) A current-interrupting device which controls a motor shall be tested under the stalled-rotor condition of the motor.

(c) *Lamps and lampholders.* (1) Lamps shall be selected to give long life under service conditions. Where possible lamps shall be operated at less than rated voltage.

(2) Lampholders shall, where possible, be of a type in which the circuit to the lamp cannot be interrupted due to vibration or to alternate heating and cooling. Bayonet or telephone type lampholders are considered preferable for miniature type lamps.

(d) *Fuses.* All fuses shall be of the National Electrical Code non-renewable cartridge type.

(e) *Terminal boards and terminals.* (1) Terminal boards shall be of the screw type, preferably with suitable barriers between terminals. The design shall be such that terminals cannot rotate once they have been secured.

(2) Closed-end wire terminal lugs of either the solder or the solderless type shall be used for all connections to terminal boards.

(f) *Switches.* (1) The handles or keys of rotary type selectro switches shall be provided with mechanical stops to prevent undue strain on the switch handle and shaft. The fixed portion of rotary switches shall be prevented from rotating by means other than friction.

(2) Normally lighted lamps shall be positively secured to their shafts and shall not rely on friction of a set screw for such means of securing. This shall be accomplished by using a non-circular shaft with a mating hole in the knob or handle. Set screws holding the knob or handle to the shaft shall thread directly into the shaft.

(g) *Indicator lamp lenses.* (1) Standard lens colors shall be used as follows:

(i) White—for "power on" indicators.

(ii) Red—for "fire" or "smoke" indicators.

(iii) Blue—for "trouble" or "power failure" indicators.

(2) Normally lighted lamps shall be shielded in such a way as not to interfere with navigating a vessel at night.

§ 161.002-8 Automatic fire detecting systems, general requirements.

(a) *General.* An automatic fire detecting system shall consist of a power supply; a control unit on which are located visible and audible fire and trouble signalling devices; and fire detector circuits, as required, originating from the control unit. Power failure alarm devices may be separately housed from the control unit and may be combined with other power failure alarm systems when specifically approved.

(b) *Types.* Automatic fire detecting systems shall be one of the following types, or a combination of two or several types:

(1) Electrical system using thermostats, thermostatic wire, or other type detector operated by heat.

(2) Electrical system using pneumatic tube or hydraulic tube detectors operated by heat.

(3) Other types as may be developed.

§ 161.002-9 Automatic fire detecting system, power supply.

(a) *General.* There shall be not less than two sources of power supply for the electrical equipment used in the operation of the fire alarm and fire detection system, one of which shall be an emergency source. The supply shall be provided by separate feeders reserved solely for that purpose. Such feeders shall run to a changeover switch situated in the control station for the fire detection system. The power supplies shall be of the types specified in this paragraph.

(1) *Normal source of supply.* The normal source of power supply for an automatic fire detecting system shall be one of the following types:

(i) Ships service power system type. The power supply shall consist of a separate branch circuit from the main switchboard.

(ii) Storage battery type. The power supply shall consist of duplicate storage batteries used for no other purpose arranged so that one battery will supply the system while the other storage battery is being charged or one storage battery in combination with an automatic charging panel that will maintain the battery in a fully charged condition at all times except immediately following discharge.

(2) *Emergency source of supply.* The emergency source of power supply for an automatic fire detecting system shall be one of the following types:

(i) Emergency lighting and power system type. The power supply shall consist of a separate branch circuit from the temporary emergency lighting and power system switchboard.

(ii) Storage battery type. The power supply shall consist of a storage battery used for no other purpose in combination with an automatic charging panel that will maintain the battery in a fully charged condition at all times except immediately following discharge. On systems using duplicate storage batteries as the normal source of supply the battery being charged may serve as the emergency source of supply.

(b) *Storage battery requirements.* Storage batteries shall comply with the requirements of § 112.55-1 of this chapter (Subchapter J—Electrical Engineering).

(c) *Capacity of storage battery.* The capacity of each storage battery shall be sufficient to supply the automatic fire detecting system for a period of not less than one week without recharging, and in no case less than 100 ampere-hours at an eight-hour discharge rate. At the end of the one week discharge period, the battery potential for a lead-acid type storage battery shall be not less than 1.75 volts per cell.

(d) *Capacity of power supply branch circuits.* The capacity of branch circuits providing power to the automatic fire detection systems shall be not less than 20 amperes and not less than 125 percent of the maximum load.

[21 FR 9035, Nov. 21, 1956, as amended by CGFR 59-21, 24 FR 7196, Sept. 5, 1959; CGFR 70-143, 35 FR 19966, Dec. 30, 1970]

§ 161.002-10 Automatic fire detecting system control unit.

(a) *General.* The fire detecting system control unit shall consist of a dripproof enclosed panel containing visible and audible fire alarm signalling devices, visible and audible trouble alarm signalling devices, visible and audible power failure alarm devices, power supply transfer switch, charging equipment when employed, and overcurrent protection for power supplies.

(b) *Fire alarm signals*—(1) *General.* The operation of any automatic fire detector (or manual fire alarm station in the case of a manual fire alarm system) shall automatically cause (i) the sounding of a vibrating type fire bell with a gong diameter not smaller than 6 inches nippled to or mounted on or within the control unit; (ii) the sounding of a vibrating type fire bell with a gong diameter not smaller than 8 inches located in the engine room; and (iii) an indication of the fire detecting zone from which the signal originated, visible at the control unit.

(2) *Maintaining signal.* The audible and visible signals resulting from the operation of a fire detector having self-restoring contacts shall be maintained automatically by the control unit until a resetting device is operated manually.

(3) *Silencing audible signal.* Manual means shall be provided at the control unit to silence the fire bells, but operation of the fire bell silencing device shall permit the visible fire signal to remain until manually reset as described in paragraph (b)(2) of this section.

(4) *Non-interference.* The control unit shall be so arranged as to permit one or any number of fire alarm signals simultaneously, and an alarm on one circuit shall not interfere with the normal operation of any other circuit, except that the fire alarm bells, when silenced by the means provided by paragraph (b)(3) of this section, need not sound upon receipt of succeeding fire alarm signals.

(5) *Source of energy.* The source of energy for the signals referred to in this paragraph shall be the "normal source". On a system supplied by duplicate storage batteries, the "normal source" shall be construed to mean that part of the supply circuit on the load side of the battery transfer switch and fuses. On a system supplied by a branch circuit the "normal source" shall be construed to mean the load side of any transformer or rectifier employed to modify the nature or magnitude of the supply potential.

(c) *Electrical supervision*—(1) *Circuits.* The circuits formed by conductors extending from the control unit to the fire detectors of each zone shall be electrically supervised.

(2) *Normal source.* The normal source of energy to the control unit shall be electrically supervised.

(3) *Fire bells.* The engine room fire bell shall be electrically supervised.

(d) *Power failure alarm signals*—(1) *Loss of potential.* The loss of potential from a supervised normal source of energy automatically shall be indicated at the control unit by the sounding of an audible power failure alarm bell. The source of energy for the power failure alarm bell shall be the emergency power source. The source of energy for the power failure alarm bell for a system supplied by duplicate storage batteries shall be the storage battery being charged.

(2) *Silencing audible signal.* Means shall be provided at the control unit to silence the power failure alarm bell by transferring the signal to a visible indicator which shall remain until the silencing means is restored to its normal position.

(e) *Trouble alarm signals*—(1) *Open Circuit.* An open circuit occurring in either supervised circuit covered by paragraph (c) (1) or (3) of this section shall automatically be indicated at the control unit by the sounding of an audible trouble alarm bell or buzzer and by a visual indicator showing the circuit or zone from which the signal originated except that on systems employing closed-circuit series connected detectors, an open circuit in the zone wiring may cause a fire alarm signal.

(2) *Silencing audible signal.* Manual means shall be provided at the control unit to silence the audible signal, but operation of the audible trouble alarm silencing means shall permit the visible trouble signal to remain until the trouble has been corrected.

(3) *Non-interference.* The control unit shall be so arranged as to permit one or any number of trouble alarm signals simultaneously, and an alarm on one circuit shall not interfere with the normal operation of any other circuit, except that the audible trouble alarm signal, when silenced by the means provided by paragraph (e)(2) of this section, need not sound on receipt of succeeding trouble signals.

(4) *Source of energy.* The source of energy for the trouble alarm signals required by this paragraph shall be the normal source as defined in paragraph (b)(5) of this section.

(f) *Circuit testing*—(1) *Fire alarm and trouble alarm test.* Means shall be provided at the control unit for individually testing each fire detecting zone circuit. The testing means shall be capable of simulating a fire alarm condition and a trouble condition.

(2) *Ground test.* Means shall be provided at the control unit for manual testing of each individual fire detecting zone circuit for the presence of grounds. Systems whose normal source of supply is derived from a circuit from the ship's alternating-current temporary emergency bus shall be provided with a two-winding transformer in the supply circuit and located in the control unit to isolate electrically the fire detecting system from the ship's electrical system.

(g) *Power supply transfer switch.* An automatic transfer switch with no "off" position shall be provided in the control unit for selecting the source of power, except that systems employing duplicate storage batteries may be provided with a manual transfer switch.

(1) *Automatic transfer switch.* Upon reduction of potential from the normal power source of 15 to 20 percent, the automatic fire detection system shall automatically be disconnected from the normal source and connected to the emergency source. Upon restoration of potential from the normal source of 85 to 95 percent of normal valves, the automatic fire detection system shall automatically be transferred back to normal source.

(2) *Manual transfer switch.* Automatic fire detecting systems employing duplicate storage batteries as the power supplies shall be provided with a manual transfer switch with no "off" position to select the battery to supply the system and the battery to be charged.

(h) *Automatic fire detecting system, battery charging and control*—(1) *General.* Automatic fire detecting systems employing duplicate storage batteries as the power supply shall be provided with battery charging and control facilities as specified by this paragraph.

(2) *Transfer switch.* A manual transfer switch shall be provided in accordance with paragraph (g)(2) of this section.

(3) *Voltmeter and voltmeter switch.* A voltmeter and a voltmeter switch shall be provided at the control unit and connected to read (i) voltage of battery supplying system and (ii) voltage of battery on charge.

(4) *Ammeter.* An ammeter shall be provided to indicate the charging current to the battery on charge.

(5) *Reverse current protection.* An undervoltage or reverse current relay shall be provided to disconnect the battery on charge from the charging source in the event of loss of potential from the charging source unless reverse current flow is effectively blocked by a rectifier.

(6) *Resistors.* Fixed and variable resistors shall be provided to regulate the charging rate, together with a two-position switch to select between a normal charging rate and a high charging rate.

(7) *Overcurrent protection.* The batteries shall be protected against overcurrent by fuses rated at not less than 150 percent and not more than 200 percent of the maximum normal battery load.

(8) *Location.* The equipment required by this paragraph shall be located in or adjacent to the control unit.

(i) *Endurance requirements.* The fire detecting system control unit shall be capable of being operated 10,000 cycles without failure of any component or undue wear or pitting of any contact. Endurance test shall be conducted in accordance with § 161.002-16(c)(6).

(j) *Under and over voltage operation.* The fire detecting system control unit shall operate successfully at both 80 percent and 110 percent of rated supply voltage. This test shall be conducted as part of the endurance test of paragraph (h) of this section.

(k) *Operation while inclined.* The control unit shall operate successfully at rated voltage while undergoing the inclination test of § 161.002-16(c)(4). This test shall be conducted as a part of the endurance test of paragraph (h) of this section.

(l) *Vibration test.* The control unit shall withstand the vibration test described in § 161.002-16(c)(3) without damage to any part and without false operation. The test shall be conducted as a part of the endurance test of paragraph (h) of this section.

(m) *Humidity test.* The control unit shall withstand without damage the humidity test of § 161.002-16(c)(5).

[CGFR 56-39, 21 FR 9035, Nov. 21, 1956, as amended by CGFR 70-143, 35 FR 19666, Dec. 30, 1970]

§ 161.002-11 Fire detecting thermostat.

(a) *General.* The scope of this section is limited to the class of fire detectors commonly referred to as spot type automatic fire detecting thermostats. Other types of fire detectors such as thermostatic wire detectors, pneumatic tubing detectors, electronic detectors, etc. will be the subject of special investigation, and will be considered equally acceptable as fire detecting thermostats when proven to be equally effective in detecting fires and equally serviceable.

(b) *Design classification.* Thermostats are classified as follows:

(1) Fixed temperature type, designed to operate when the temperature at the device reaches a predetermined value.

(2) Rate of rise type, designed to operate when the rate of temperature rise at the device reaches a predetermined value.

(3) Those which, when, and as installed are capable of repeat operation.

(4) Those which, when, and as installed must be replaced when they have once operated.

(5) Combinations of two or more of these classifications.

(c) *Temperature classifications.* Thermostats of the fixed temperature type are classified as to temperature of operation as follows:

(1) Ordinary degree, for use where the normal temperature at the device does not exceed 100° F.

(2) Intermediate degree, for use where the normal temperature at the device exceeds 100 but not 150° F.

(3) Hard degree, for use where the normal temperature at the device exceeds 150 but not more than 225° F.

(d) *General construction requirements*—(1) *Material, form, and arrangement.* The material, the form, and the arrangement of parts shall be such that the thermostats will be practicable to manufacture, install, and maintain, and be reliable and consistent in operation. They shall be so designed as to be free from liability to ordinary mechanical injury when installed and from the effects of moisture and interference by clogging with dust, insects, and other foreign material. Thermostats having contacts exposed to the atmosphere will not be considered.

(2) *Uniform operation.* A thermostat must be constructed so that reasonably uniform operation from application of heat will result regardless of variations in position or exposure to air flow from varying directions. In devices where variations in operation are possible from different positions of the device with respect to the direction of air flow, the spacing classification of the device will be judged from data obtained in tests where the device is mounted in the least favorable position as regards reception of heated air currents.

(3) *Replacement.* Thermostats requiring replacement after operation shall indicate when operated.

(4) *Renewable element.* In thermostats where the thermally-sensitive element is renewable and must be replaced after operation, the renewable element shall bear the manufacturer's name or other identification and the degree rating. Thermostats shall be capable of installation with ordinary tools.

(5) *Shipping.* Thermostats shall be so constructed that parts will not become displaced during shipment or after installation.

(e) *Mounting.* (1) Thermostats shall be designed for mounting on a standard outlet box unless a box of special design is furnished as a part of the assembly.

(2) When the junction box is not furnished with the thermostat, drawings shall clearly indicate the dimensions of the junction box to be used.

(f) *Adjustment.* (1) Thermostats shall not be capable of being adjusted after shipment from the factory.

(2) Adjustments made in the factory shall be securely sealed.

(3) Screws used in making adjustments shall be close fitting, of small pitch, and provided with reliable locking means.

(g) *Adaptability to fire detecting systems.* Thermostats shall be of such design that they are capable of connection on a supervised system of wiring.

(h) *Materials.* (1) Diaphragms and spring parts, if used, should preferably be of phosphor bronze or beryllium-copper (thermo-responsive springs excepted).

(2) Solder, if used as the operating member of a thermostat, shall be specially investigated for stability and other necessary properties.

(3) Where a sealing compound is used in thermostats, its melting point shall be at least 15° C. higher than the rated temperature of operation of the device.

(i) *Electrical.* (1) Contacts shall be so designed that it is practicable to make any adjustments necessary during factory assembly, and so that the contact action will be positive and reliable.

(2) Sliding or pivoted current-carrying parts, if used, shall be shunted by flexible copper conductors.

(3) Ample separation of contacts tips shall be provided.

(4) The contacting parts shall have tips of silver or an equivalent material securely attached and in proper alignment.

(5) All current-carrying parts shall be insulated or otherwise protected.

(6) Separate terminal screws shall be provided for the incoming and outgoing circuit wires.

(7) Nuts and heads of screws used to secure current-carrying parts (other than those for the circuit wires) shall, wherever possible, be countersunk and covered with a sealing compound. The countersinking should be such as to provide a full ⅛ inch clearance from the mounting surface.

(j) *Marking.* Each thermostat shall be plainly marked with the name of the manufacturer or accepted abbreviation therefor, the approval number, and, if of the fixed temperature type, with the temperature rating.

(k) *Temperature of operation.* (1) Fixed temperature thermostats shall be designed for an operating temperature within the limits given in Table 161.002-11(k)(1)(i).

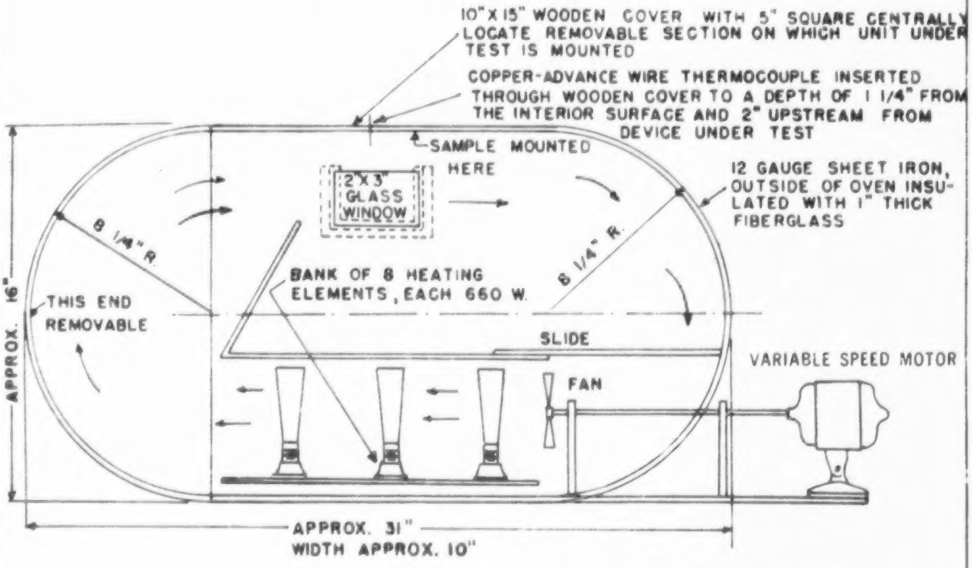
TABLE 161.002-11(k)(1)(i)

Rating	Limits of rated temperature of operation (°F.)	
	Maximum	*Minimum*
Ordinary	165	135
Intermediate	225	175
Hard	300	250

(2) The temperature of operation of fixed temperature thermostats shall be determined in a well-stirred bath in which the rate of temperature rise is not greater than 1° F. per minute as measured by a thermometer. The thermostats shall be immersed in the bath near the thermometer which is read at regular intervals.

(3) The temperature of operation of fixed temperature thermostats when tested as described in paragraph (k)(2) of this section shall be within plus or minus 5° F. of their rated temperature of operation if of the ordinary rating or within plus or minus 10 to 15° F. if of the intermediate or hard rating. Not less than three thermostats shall be so tested.

(l) *Sensitivity.* (1) Not less than three thermostats shall be tested for sensitivity in an electric oven designed for conducting sensitivity tests. The oven employed shall be capable of close temperature and air current control. Tests are made under the time-temperature curves shown in Figure 161.002-11(L)(1) while mounted in a manner normal for its installation in an air stream having a velocity of 200 to 220 feet per minute. A sketch of the test oven that will be employed is shown on Figure 161.002-11(L).


10"X 15" WOODEN COVER WITH 5" SQUARE CENTRALLY LOCATE REMOVABLE SECTION ON WHICH UNIT UNDER TEST IS MOUNTED
COPPER-ADVANCE WIRE THERMOCOUPLE INSERTED THROUGH WOODEN COVER TO A DEPTH OF 1 1/4" FROM THE INTERIOR SURFACE AND 2" UPSTREAM FROM DEVICE UNDER TEST
SAMPLE MOUNTED HERE
2"X 3" GLASS WINDOW
12 GAUGE SHEET IRON, OUTSIDE OF OVEN INSULATED WITH 1" THICK FIBERGLASS
8 1/4" R.
8 1/4" R.
BANK OF 8 HEATING ELEMENTS, EACH 660 W.
THIS END REMOVABLE
APPROX. 16"
SLIDE
VARIABLE SPEED MOTOR
FAN
APPROX. 31"
WIDTH APPROX. 10"

THERMOSTAT SENSITIVITY TEST OVEN FIG. 161.002-11(L)

(2) Thermostats when tested in accordance with paragraph (k)(1) of this section shall operate in 2 minutes or less.

(3) Thermostats which operate in 2 minutes or less when subjected to the time-temperature conditions shown on Figure 161.002-11(L)(1) will be rated as to permissible spacing according to their performance. Spacings other than 10, 12½, and 15 feet will not ordinarily be considered.

(4) Thermostats for which a permissible spacing qualification in excess of 15 feet is desired may be subjected to fire tests to compare their performance at the increased spacing with the performance of several approved 15-foot spacing thermostats when subjected to several rate-of-rise conditions.

(5) The operation of thermostats in the sensitivity oven must be sufficiently uniform to indicate accurate assembly and reliability.

(6) Thermostats of the rate-of-rise type, in addition to other requirements of this paragraph, shall operate at a rate of temperature rise likely to result from fire but unlikely to occur from other causes. A thermostat which operates when the rate-of-rise of temperature is maintained between 15° and 20° F. per minute and which does not operate when the rate-of-rise of temperature is much below that value, generally satisfies this condition. Tests shall be conducted in an oven as described in paragraph (k)(1) of this section.

(7) The results obtained in repeat tests on the same rate-of-rise thermostat shall closely correspond, as shall also the results of tests on different samples having the same adjustment and setting.

(m) *Premature operation test.* Clean fixed-temperature thermostats must not operate prematurely when subjected to high normal room temperature as given in Table 161.002-11(m) for a period of 30 days.

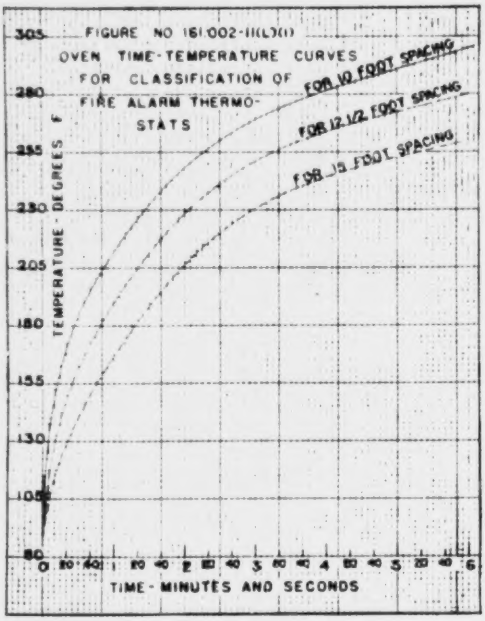


TABLE 161.002-11(m)

Rating	*Temperature, °F.*
Ordinary	125
Intermediate	165
Hard	240

(n) *Corrosion and loading tests.* (1) Thermostats, when spray painted with a lead-oil type paint along with the ceiling on which they are mounted a sufficient number of times to build up a hard dry coating of 1/32 inch in thickness on the exposed external parts, shall operate in 4 minutes or less if of the fixed temperature type, and, if of the rate-of-rise type, shall operate at rates of rise not more than 25 percent greater than the rate at which it operated when tested clean.

(2) Thermostats, after being subjected to a 200-hour salt spray test in accordance with A. S. T. M. Standard B117, shall operate in 3 minutes or less if of the fixed temperature type, and, if of the rate-of-rise type, shall operate at rates of rise not more than 25 percent greater than the rate at which it operated when tested clean.

(o) *Rough usage tests.* Thermostats shall be tested to determine whether they may be dropped or subjected to moderately rough usage with the tools ordinarily used in installation, such as screwdriver, pliers, or hammer, depending upon the type of thermostat, without affecting their operation.

(p) *Vibration tests.* The thermostat shall be subjected to the vibration test described in § 161.002-16(c)(3). No false operation or breakage or injury to the thermostat shall result. Vibration test shall be performed in an ambient temperature approximately equal to the appropriate temperature indicated in Table 161.002-11(m).

(q) *Dielectric strength test.* The thermostat shall be capable of withstanding without damage the dielectric strength test of § 161.002-6(g)(1), after which test the insulation resistance shall be not less than that specified by § 161.002-6(g)(2).

§ 161.002-12 Manual fire alarm systems.

(a) *General.* A manual fire alarm system shall consist of a power supply, a control unit on which are located visible and audible fire and trouble signalling devices, and fire alarm circuits as required originating from the control unit and terminating at manual fire alarm boxes. Power failure alarm devices may be separately housed from the control unit and may be combined with other power failure alarm systems when specifically approved.

(b) *Types.* Manual fire alarm systems shall be one of the following types, or a combination of several types:

(1) Manual fire alarm stations superimposed on and connected as an integral part of the fire detector circuit wiring of an automatic fire detection system.

(2) Electrical system using manually operated fire alarm boxes.

(3) Other types as may be developed.

(c) *Power supply.* The power supply shall be as specified for automatic fire detecting system by § 161.002-9.

(d) *Manual fire alarm system control unit.* The manual fire alarm system control unit shall be as specified for automatic fire detecting systems by § 161.002-10.

§ 161.002-13 Manual fire alarm boxes.

(a) A manual fire alarm box shall consist of a rugged cast metal junction box and cover on which is mounted a prominent operating lever to actuate the alarm. Pulling the operating lever shall shatter a window of glass or other suitable material, thereby automatically operating an alarm switch. Manual fire alarm boxes employing different methods of operation or different forms of construction or materials from that described in this paragraph will be considered provided the operation is equally positive, simple, quick and obvious.

(b) The operating instructions for the fire alarm box shall be clear, concise, conspicuous, and protected against obliteration.

(c) The fire alarm box shall be finished in typical bright red with the operating instructions finished in a contrasting color.

(d) The manual fire alarm box shall be operated manually in the intended manner not less than 100 times to assure reliable operation.

(e) The switch unit in the manual fire alarm box shall operate at least 10,000 cycles, making and breaking a direct-current load equal to the rated current of the switch at rated voltage without failure. The switch unit shall also be capable of operating 50 cycles with the current increased to 150 percent of rated current. Tests shall be conducted at not more than 10 cycles per minute.

(f) The manual fire alarm box shall withstand without damage the dielectric strength test of § 161.002-6(g)(1) after which test the insulation resistance shall be not less than that specified by § 161.002-6(g)(2).

§ 161.002-14 Watchman's supervisory systems.

(a) *General.* The watchman's supervisory system shall consist of apparatus to verify the presence of watchmen and the regular performance of their assigned duties.

(b) *Types.* The watchman's supervisory systems shall be one of the following types, or a combination of several types:

(1) A mechanical system consisting of portable spring-motor-driven recording clocks in conjunction with key stations located along the prescribed routes of the watchmen to operate the clock recording mechanism.

(2) An electrical system employing a recorder located at a central station in conjunction with key stations along the prescribed route of the watchmen.

(3) Other types that may be developed.

(c) *Portable spring-motor-driven recording clocks.* (1) Each clock shall run for at least one week without rewinding and shall be substantially mounted and strongly encased. It shall be made so that the recordings cannot be seen without opening the case and so that the case cannot be opened without indicating, by a distinctive recording, the time of opening and closing.

(2) The records of the recording watch clock shall be legible and permanent.

(d) *Key stations for use with portable recording watch clocks.* (1) The key station shall be of substantial construction and provided with a hinged cover.
The key shall be attached to the station by means of a strong link chain. The key stations shall be mounted in such a manner that they cannot be removed without giving evidence of removal.

(2) Keys shall be made so that they are difficult to duplicate, and shall be of a pattern susceptible of variations tending to reduce the probability that a set of keys for one clock will operate other clocks.

[21 FR 9032, Nov. 21, 1956, as amended by CGFR 59-7, 24 FR 3241, Apr. 25, 1959]

§ 161.002-15 Smoke detecting systems.

(a) *General.* The smoke detecting system shall consist of a means for continuously exhausting an air sample from the protected spaces and testing the air for contamination with smoke of all colors or particle sizes, together with visual or visual and aural means for indicating the presence of smoke.

(1) The scope of this section is limited to systems in which the control unit is to be located in the wheelhouse or fire control room. Where different arrangements of the detecting units are contemplated, the system may be examined and tested according to the intent of this section, and, if found to

be substantially equivalent, may be approved.

(b) *Types.* The smoke detecting system shall be one of the following types:

(1) Visual detection type wherein the presence of smoke is detected visually and by sense of smell.

(2) Aural type wherein the presence of smoke is detected visually and audibly and by sense of smell.

(3) Visual or aural type combined with carbon dioxide extinguishing system.

(4) Other types as may be developed.

(c) *Power supply.* The power supply for smoke detecting systems shall be from the emergency lighting and power system as required by Subpart 113.70 in Part 113 of Subchapter J (Electrical Engineering) of this chapter.

(d) *Suction fans.* (1) Suction fans shall be provided in duplicate, with the system arranged for one fan to be operated at a time.

(2) The suction fans shall be of sufficient capacity to provide a suction at the control unit of at least 1 inch of water with each zone connected with 350 feet of ¾ inch standard pipe.

(e) *Smoke detecting system control unit*—(1) *General.* A smoke detecting system control unit shall consist of a drip-proof enclosed panel containing the smoke indicating devices, trouble alarm signalling devices, power failure alarm devices, and overcurrent protection for the system and for the exhaust fans. Power failure alarm devices may be separately housed from the control unit and may be combined with other power failure alarm systems when specifically approved.

(2) *Sampling characteristics.* The control unit shall be designed to extract air samples continuously from the smoke detecting zones. Visual detection of smoke in the air samples from all zones shall be continuous, except that the air samples may be diverted from the visual detector momentarily for aural detection purposes. Aural detection of smoke in the air samples from the several smoke detecting zones may be done in sequence in which case the unit shall cycle at a rate not to exceed 5 seconds per zone. Where aural detection of smoke in the air samples from all zones is accomplished simultaneously, the aural detector shall operate for at least 3 seconds in each minute.

(3) *Visual smoke indication.* The presence of smoke in the concentrations specified by paragraph (g) of this section in the air sample being exhausted from any of the protected spaces shall automatically be indicated visually to an observer directly in front of the control unit. The visual indication shall indicate the zone from which the smoke originated and shall be continuous so long as the smoke is present except as provided in paragraph (e)(2) of this section.

(4) *Aural smoke indication.* The presence of smoke in the concentrations specified by paragraph (g) of this section in the air sample being exhausted from any of the protected spaces shall in systems of the aural type, automatically be indicated by the sounding of a vibrating type fire bell with a gong diameter not smaller than 6 inches, nippled to or mounted on or in the control unit, the sounding of vibrating type fire bell with a gong diameter not smaller than 8 inches located in the engine room, and the lighting of a smoke indicator lamp.

(i) Means shall be provided to silence the audible signals, but the visible smoke indicator lamp shall remain lighted until the smoke alarm relay is manually reset.

(ii) Resetting the smoke alarm relay without restoring the fire bell silencing means to the normal position shall be indicated by trouble signals as described in paragraph (e)(7) of this section.

(5) *Detection by smell.* A sufficient quantity of exhaust from the control unit shall be discharged into the pilothouse or fire control station to permit detection of fire by odor. A valve shall be provided to direct the exhaust, if obnoxious, to the outside.

(6) *Supervision.* Electrical circuits, the failure of which would prevent the smoke detector from properly functioning, shall be electrically supervised. Circuits to be electrically supervised shall include, but not necessarily be limited to, the following circuits, when employed. Audible detector

lamp, visible detector lamp, voltage regulator, exhaust fans and fire bells.

(i) The flow of air from each of the protected spaces shall be supervised in such a way that an observer at the control unit can detect the absence of air flow.

(7) *Trouble alarms.* An open circuit condition existing in any supervised circuit shall be indicated at the control unit by the sounding of an audible trouble buzzer or bell and by the lighting of a trouble light indicating the circuit from which the signal originated. Means shall be provided to silence the trouble buzzer, but the trouble light shall remain lighted until the buzzer silencing device is restored to the normal position.

(8) *Power failure alarm.* Loss of potential on the load side of the control unit overcurrent protective device shall be indicated by a power failure buzzer located in the wheelhouse or fire control room. Provisions shall be made to silence the power failure alarm buzzer by transferring the signal to a visible indicator. Reestablishing potential to the system shall again cause the power failure buzzer to sound until the silencing means is restored to the normal position.

(i) The source of power for the power failure alarm signals shall be a storage battery. The storage battery may supply loads other than the smoke detector system power failure alarm load, but shall be independent of the smoke detector system main power supply.

(9) *Circuit arrangement and protection.* (i) A manual disconnect switch shall be provided to disconnect the control unit from the supply circuit. On the load side of the manual disconnect switch, overcurrent protection shall be provided for the system. The rating or setting of the overcurrent device shall be not less than 200 percent of the system load.

(ii) Suction fans shall be furnished in duplicate with a control switch and running overcurrent protection provided for each fan motor.

(10) *Adjustments.* Means shall be provided to adjust the sensitivity of an aural smoke detector to compensate for normal aging characteristics of the components and for the effects of dust collecting in the control unit unless such compensation is effected automatically or by other satisfactory means.

(11) *Circuit testing.* The control unit shall be provided with a means for being tested while in operation. The test shall cause operation of the alarm circuits by initiating the sequence of actions through a disturbance in the unit.

(f) *Sensitivity test equipment and smoke sources*—(1) *General.* The smoke meter that will be employed to measure the sensitivity of smoke detector system is shown on Figure 161.002-15(f).

(2) *Photo cell.* The photo cell should be highly sensitive, capable of high output, and with a major portion of its characteristic very near linear. Mounted in the smoke meter described herein and with the lamp operating at 10.5 volts, the cell should have an output near 180 microamperes with clear air and with the heat-resistant glass partition removed.

(3) *Microammeters.* In order to maintain linearity, the resistance of the microammeters should be as low as possible. The 0 to 30 scale microammeter shown on Figure 161.002-15(f) has a resistance of 150 ohms, while the 0 to 200 scale microammeter has a resistance of 55 ohms.

(4) *Constant voltage supply.* In order to maintain constant potential to the lamp, a constant voltage transformer is necessary. The constant voltage transformer should have a 95-125 volt primary and a 12 volt ±½ percent secondary.

(5) *Lamp and lens.* The smoke meter shown in Figure 161.002-15(f) is designed to use a Westinghouse Lamp No. 1747-50 CP-S-11 bulb, 12-16 volts, single contact, bayonet base. The lamp is operated at 10.5 volts through a variable series resistor. The lamp should be operated for approximately 24 hours before calibrating the smoke meter. Each time the lamp is energized, it should be permitted to burn for approximately 1 hour to stabilize its output. The lens used with the smoke meter is a 38 mm diameter, 63.1 mm focal length, double convex condensing lens.

(6) *Meter tube.* The inside diameter of the meter tube is 1⅝ inches and its length, measured from the lens at the lamp end to the heat-resisting glass partition at the cell end, is 5 feet. The tube is made in three slip-joint sections for portability, and the interior walls of the tube are painted a dull black. The photoelectric cell is mounted in a suitable housing at the end of the tube. A glass partition of ⅛ inch thick heat-resisting glass is provided in front of the active face of the photoelectric cell to absorb the heat of the light beam and to reduce the output of the cell from its normally high output of approximately 180 microamperes to approximately 125 microamperes. A slot is provided for inserting calibration screens between the cell and the glass partition.

(7) *Method of calibration.* The smoke meter is calibrated by inserting in the calibration slide openings transparent screens, such as thin glass slides or plastic sheets. The transmission of the calibration slides to the band of wave lengths emitted by the lamp must be accurately known. By observing the cell output with various calibrated slides inserted, a curve of cell output versus percent light obscuration may be obtained. The smoke meter is then calibrated in the following steps:

(i) *Focus.* The distance between the lamp and the lens is adjusted to secure a bright uniform illumination over the cell face.

(ii) *Zeroing meter.* After the lamp has been burning at 10.5 volts for at least 1 hour or until the output of the photoelectric cell has become constant, the shunt across the 30-microammeter full scale meter shall be adjusted so that the microammeter reads full scale with clear air passing through the meter tube. This is the "zero" of the smoke meter and the shunt adjustment then shall be sealed or protected so that the adjustment remains fixed. Any further zero adjustment is made by means of the lamp rheostat.

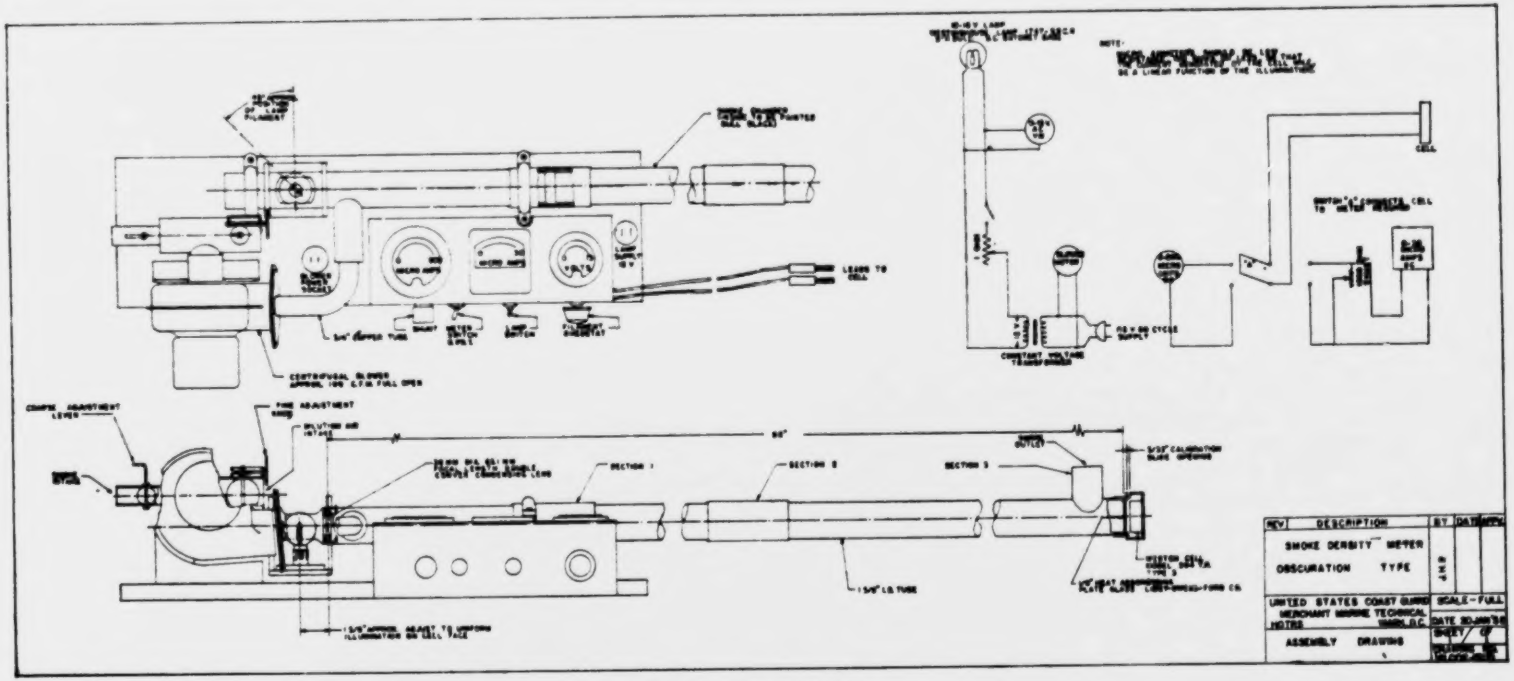

CENTRIFUGAL BLOWER
3/4" COPPER TUBE
LEADS TO CELL
MICRO AMPS
VOLTS
LAMP SWITCH
FILAMENT RHEOSTAT
COARSE ADJUSTMENT LEVER
FINE ADJUSTMENT KNOB
DILUTION AIR INTAKE
SECTION 1
SECTION 2
SECTION 3
SMOKE OUTLET
1 5/8" I.D. TUBE
NOTE:
CONSTANT VOLTAGE TRANSFORMER
CELL
REV
DESCRIPTION
BY
DATE
SMOKE DENSITY METER
OBSCURATION TYPE
UNITED STATES COAST GUARD
MERCHANT MARINE TECHNICAL
HDTRS WASH. D.C.
SCALE—FULL
ASSEMBLY DRAWING
SHEET OF

FIGURE 161.002-15(f)

(iii) *Calibration.* After the zero adjustment has been made, the calibration screens may be inserted in the slot in front of the cell and the meter readings recorded. Calculate the percent obscuration for each screen relative to maximum scale reading with clear air, or 30 microamperes, which is 100 percent transmission or zero obscuration. These values represent percent obscuration in 5 feet. From these values, calculate the percent obscuration in a one foot column by the formula (1).

$$K=100[1-(1-R)^{1/5}] \qquad (1)$$

Where:

K = percent obscuration in 1 foot.
R = fraction of light obscured in 5 feet.

Values of K plotted against the cell output represents the calibration graph of the smoke meter.

(8) *Smoke density meter reading.* The term "smoke density meter reading" as used herein will mean the value K, percent obscuration of the smoke on a one foot basis, determined in the manner described above.

(9) *Smoke sources.* (i) A Type I smoke shall be smoke obtained from smoldering oil-free cotton waste.

(ii) A Type II smoke shall be smoke obtained from freely burning kerosene-saturated cotton waste.

(g) *Sensitivity requirements.* (1) The control unit shall be mounted in its intended manner, and one smoke detecting zone shall be connected to the smoke density meter described in paragraph (f) of this section by means of ¾-inch standard pipe. The connection shall be as short and as direct as practicable so that there will be no appreciable transit time of smoke from the smoke density meter to the control unit. All other zones shall be restricted in such a manner as to simulate a load on the suction fan equivalent to that of a 350-foot length of ¾-inch standard pipe for each zone. Where the control unit is of the type in which the aural detector tests the combined discharge of all zones simultaneously sensitivity tests will be conducted with a control unit having the maximum number of zones for which approval is desired.

(2) With the system operating at rated supply voltage and the control unit adjusted for optimum performance, Type I smoke in quantities sufficient to give a "smoke density meter reading" of 2 percent shall be admitted to the smoke detecting zone under test.

(i) The smoke shall be detected by an observer directly in front of a visual detection type control unit.

(ii) The audible smoke alarm of an aural type control unit shall sound within one sampling cycle of the control unit.

(3) With no change in the adjustment of the control unit and no change in the "smoke density meter reading" from those of the preceding test, the supply potential of the smoke detector system shall be decreased to 80 percent of rated voltage.

(i) The smoke shall be detected by an observer directly in front of a visual detection type control unit.

(ii) The audible smoke alarm of an aural type control unit shall sound within one sampling cycle of the control unit.

(4) With the supply potential reduced to 80 percent of rated voltage and with no change in the adjustment of the control unit from the previous test, Type II smoke in quantities sufficient to give a "smoke density meter reading" of 5 percent shall be admitted to the smoke detector zone under test.

(i) The smoke shall be detected by an observer directly in front of a visual detection type control unit.

(ii) The audible smoke alarm of an aural type control unit shall sound within one sampling cycle of the control unit.

(h) *Endurance requirements.* The control unit shall be capable of being operated for 10,000 cycles at rated voltage without failure of any component or undue wear or pitting of any contact. Endurance test shall be conducted in accordance with § 161.002-16 (c) (7).

(i) *Inclination test.* The control unit shall operate successfully while undergoing the inclination test of § 161.002-16(c)(4).

(j) *Resistance to vibration.* The control unit shall withstand without damage and without false operation the vibration test described in

§ 161.002-16(c)(3). The tests shall be performed with circuits in the normal supervisory position.

(k) *Humidity test.* The system shall withstand without damage the humidity test of § 161.002-16(c)(5).

[21 FR 9032, Nov. 21, 1956, as amended by CGFR 61-15, 26 FR 9301, Sept. 30, 1961]

§ 161.002-16 Methods of sampling, inspection and testing.

(a) *Sampling and inspection.* Fire detecting equipment covered by this specification is not normally inspected at regularly scheduled factory inspections of production lots, but the Commander of the Coast Guard District may detail a marine inspector at any time to visit any place where such fire detecting equipment is manufactured to check materials and construction methods, and to conduct such tests and examinations as may be required to satisfy himself that the equipment is being manufactured in compliance with the requirements of this specification and with the manufacturer's plans and specifications approved by the Commandant.

(b) *Type approval tests*—(1) *General.* Type approval tests shall have as their purpose to demonstrate that a manufacturer is capable of producing equipment suitable for shipboard use in accordance with the specification requirements of this subpart. Type approval tests may be conducted on individual components of equipment or on a complete system.

(2) *Where tested.* All tests shall be conducted at the National Bureau of Standards, Washington, D.C., or at another laboratory designated by the Coast Guard.

(3) *Costs.* All costs of the tests required by this subpart shall be defrayed by the manufacturer and the material to be tested shall be furnished without cost to the U. S. Government.

(4) *Order of tests.* Tests shall be conducted in the order listed in this paragraph. Listed opposite each test is the corresponding reference paragraph which gives the specified performance requirements and the associated test description. Except where otherwise indicated, all tests shall be conducted on the same sample equipment.

(i) *Fire detecting system control unit tests.*

TABLE 161.002-16(b)(4)(i)

Test	Performance requirement	Test description
(a) General inspection	161.002-, -2, -3, -4, -5, -6, -7, -8, -9, -10, and -12.	161.002-16(c)(2).
(b) Humidity test	161.002-6(g), 161.002-10(m). 161.002-16(c)(5).	161.002-6(g), 161.002-16(c)(5).
(c) Endurance test	161.002-7(b)(3), 161.002-10(i)	161.002-7(b)(3), 161.002-16(c)(3), 161.002-16(c)(4), 161.002-16(c)(6).
(d) Special additional tests	161.002-16(c)(9)	161.002-16(c)(9).

(ii) *Fire detecting thermostat tests.*

TABLE 161.002-16(b)(4)(ii)

Test	Performance requirement	Test description
(a) General inspection	161.002-1, -2, -3, -4, -5, -6, -7, and 11	161.002-16(c)(2).
(b) Temperature of operation	161.002-11(k)(3)	161.002-11(k)(2).
(c) Sensitivity	161.002-11(l)	161.002-11(l).
(d) Premature operation	161.002-11(m)	161.002-11(m).
(e) Salt spray	161.002-11(n)(2)	161.002-11(n)(2).
(f) Sensitivity	161.002-11(n)(2)	161.002-11(l).
(g) Loading	161.002-11(n)(l)	161.002-11(n)(1).
(h) Sensitivity	161.002-11(n)(l)	161.002-11(l).
(i) Rough usage	161.002-11(o)(l)	161.002-11(o)(l).
(j) Vibration	161.002-11(p)	161.002-16(c)(3).
(k) Dielectric	161.002-11(q)(2)	161.002-6(g)(1).

TABLE 161.002-16(b)(4)(ii)—Continued

Test	Performance requirement	Test description
(l) Insulation resistance	161.002-11(q)(2)	161.002-6(g)(2).
(m) Special additional tests	161.002-16(c)(9)	161.002-16(c)(9).

(iii) *Manual fire alarm box tests.*

TABLE 161.002-16(b)(4)(iii)

Test	Performance requirement	Test description
(a) General inspection	161.002-1, -2, -3, -4, -5, -6, -7, and -13	161.002-16(c)(2).
(b) Manual operation	161.002-13(d)	161.002-13(d).
(c) Endurance	161.001-13(e)	161.002-6(e).
(d) Dielectric	161.002-13(f)	161.002-6(g)(l).
(e) Insulation resistance	161.002-13(f)	161.002-6(g)(2).
(f) Special additional tests	161.002-16(c)(9)	161.002-16(c)(9).

(iv) *Watchman's supervisory system equipment tests.*

TABLE 161.002-16(b)(4)(iv)

Test	Performance requirement	Test description
(a) General inspection	161.002-1, -2, -3, -4, -5, -6, -7, and -14	161.002-16(c)(2).
(b) Special additional tests	161.002-16(c)(9)	161.002-16(c)(9).

(v) *Smoke detecting system control unit tests.*

TABLE 161.002-16(b)(4)(v)

Test	Performance requirement	Test description
(a) General inspection	161.002-1, -2, -3, -4, -5, -6, -7, and -15	161.002-16(c)(2).
(b) Sensitivity	161.002-15(g)	161.002-15(f), -15(g).
(c) Humidity test	161.002-6(g), 161.002-15(k)	161.002-6(g), 161.002-16(c)(5).
(d) Endurance test	161.002-15(h), 161.002-15(i), 161.002-15(j)	161.002-16(c)(3), 161.002-16(e)(4) 161.002-16(c)(7).

(c) *Description of tests*—(1) *Method of mounting.* For all tests not otherwise specified, the equipment shall be secured to the mounting brackets of the test machine in the same position and manner that it will be mounted on shipboard.

(2) *General inspection.* The equipment shall be given a thorough visual inspection to determine if the equipment conforms to this specification with respect to material, finish, workmanship, fit, construction, clearances, nameplates, and instructions. This general inspection shall include a check of all operating controls, circuit functions, test facilities and adjustments.

(3) *Vibration test.* (i) The equipment shall be secured to a vibration table and vibrated along each of the three principal axes at frequencies from 5 to 25 cycles per second at a table amplitude of between 0.003 inch and 0.008 inch (total excursion of between 0.006 and 0.016 inch). The change from one frequency to the next shall be made slowly and uniformly. At each integral frequency, vibration shall be maintained for 2 minutes. Upon completion of the test described above, the equipment shall be vibrated along each of the principal axes at the one frequency which observations made during the test above show to be the most likely frequency to cause failure of the equipment. The amplitude of vibration

during this latter test shall be 0.03 ±0.006 inch (total excursion 0.06 ±0.012 inch) and the test shall be run for 2 hours on each axis.

(ii) This test shall be conducted with the equipment energized and operating in its normal manner. The test shall not interrupt normal functioning or damage the equipment.

(iii) Where the size of the unit prohibits its being vibration tested as a whole, the components judged to be liable to damage or faulty operation due to vibration may be individually tested in accordance with the intent of this subparagraph.

(4) *Inclination test.* (i) The equipment shall be inclined at the rate of 5 to 7 cycles per minute in one plane to an angle of 30 degrees on either side of the vertical for a period of 30 minutes.

(ii) The test specified by § 161.002-17(c)(4)(i) shall be repeated with the equipment reoriented 90 degrees on a vertical axis to the plane in which it was originally tested.

(iii) At the conclusion of the cyclic tests described in this paragraph, the cyclic motion shall be stopped, and with the inclination adjusted to 22 1/2 degrees, the equipment shall remain in this position for a period of 30 minutes.

(iv) The tests required by this paragraph shall be conducted with the equipment operating in its normal manner. The tests shall not interrupt normal functioning or damage the equipment.

(5) *Humidity test*—(i) *General.* The equipment shall be subjected to the following conditioning and tests. The equipment shall not be energized during the test.

(ii) *Conditioning.* In order to establish a reference condition for the measurement of operating parameters and a valid basis for comparison of the effects of the conditioning to follow, the complete equipment shall be dried at a temperature of not less than 40°C. nor more than 50° C. for at least 2 hours.

(iii) *Reference measurements.* Following the conditioning specified in paragraph (c)(5)(ii) of this section, the equipment shall be subjected to the dielectric strength test of § 161.002-6(g)(1), after which the insulation resistance shall be not less than that specified by § 161.002-6(g)(2).

(iv) The equipment shall then be placed in a chamber and subjected to a relative humidity of 95 ±5 percent and a temperature of 40° C. ±2° C. for a period of 100 hours. At the conclusion of the 100-hour humidity test, the dielectric strength test of § 161.002-6(g) shall be repeated, except that the dielectric strength test potential shall be one-half the value specified in § 161.002-6(g)(1).

(v) The insulation resistance of electrical circuits following the dielectric strength test shall not be less than 1 megohm at 500 volts direct current.

(6) *Endurance test, fire detecting system control unit.* The control unit, including fire bells and audible trouble and power failure alarm devices, shall be operated for 10,000 cycles. A cycle of operation shall consist of (i) simulated fire alarm condition on all zones for a period of approximately 1.0 second, (ii) circuits restored to normal condition for a period of approximately 1.5 seconds, (iii) simulated trouble alarm condition on all zones and supervised bell circuits for a period of approximately 1.0 second, (iv) circuits restored to normal condition for a period of approximately 1.5 seconds, (v) simulated power failure condition for a period of approximately 1.0 second, and (vi) circuits restored to normal condition for a period of approximately 1.5 seconds. Where this sequence of operation is not easily effected due to the type of reset mechanism or to other factors, the cycle of operation may be varied in accordance with the intent of the above cycling test. The first 50 cycles of operation shall be conducted with a supply potential of 80 percent of rated supply voltage. The following 1,000 cycles of operation shall be conducted with the supply potential increased to 110 percent of rated supply voltage. The following 8,900 cycles of operation shall be conducted with the supply potential at rated supply voltage. The final 50 cycles of operation shall be conducted with the supply potential increased to 115 percent of rated supply voltage. The rated voltage endurance test shall be interrupted as necessary

to perform the vibration and inclination tests.

(7) *Endurance test, aural smoke detecting system control*—(i) *Control unit.* The control unit, including fire bells and audible trouble and power failure alarm devices, shall be operated for 10,000 cycles at rated voltage. A cycle of operation shall consist of (A) simulated smoke alarm condition for a period of approximately 1.0 second, (B) circuits restored to normal condition for a period of approximately 1.5 seconds, (C) simulated trouble alarm condition on all supervised circuits for a period of approximately 1.0 second, (D) circuits restored to normal condition for a period of approximately 1.5 seconds, (E) simulated power failure condition for a period of approximately 1.0 second, and (F) circuits restored to normal condition for a period of approximately 1.5 seconds. Where this sequence of operation is not easily effected due to the type of reset mechanism or to other factors, the cycle of operation may be varied in accordance with the intent of the above cycling test. The first 50 cycles of operation shall be conducted with a supply potential of 80 percent of rated supply voltage. The following 1,000 cycles of operation shall be conducted with the supply potential increased to 110 percent of rated supply voltage. The following 8,900 cycles of operation shall be conducted with the supply potential at rated supply voltage. The final 50 cycles of operation shall be conducted with the supply potential increased to 115 percent of rated supply voltage. The rated voltage endurance test shall be interrupted as necessary to perform the vibration and inclination test.

(ii) *Suction fans and other components.* The suction fans and other components that operate continuously, such as motor-driven timers, shall be continuously operated at rated voltage for a period of 60 days without failure and without undue deterioration.

(8) *Endurance test, visual smoke detecting system.* The entire system shall be operated in the normal operating condition and at rated voltage continuously for a period of 60 days, after which the trouble alarm and power failure alarm devices shall be operated for 10,000 cycles. A cycle of operation shall be (i) a trouble alarm condition for a period of approximately 1.0 second, (ii) circuits restored to normal condition for a period of approximately 1.5 seconds, (iii) power failure alarm condition for approximately 1.0 second, and (iv) circuits restored to normal condition for approximately 1.5 seconds. The endurance test shall be conducted in the same manner as described in paragraph (c)(7) of this section for the aural type smoke detector control unit.

(9) *Special additional tests.* In cases where a study of the design of a unit discloses additional features likely to effect reliability of operation or other undesirable characteristics, suitable additional tests shall be made as necessary.

(d) *Procedure for approval.* (1) Before approval action is taken on any equipment or systems covered by this specification, detail plans in triplicate covering fully the arrangement, construction, and materials of the equipment shall be submitted to the Commandant. If the equipment has previously been tested by Underwriters' Laboratories, Inc., or by some other recognized testing organization, a copy of the test report shall also be submitted.

(2) After the plans have been reviewed and any necessary corrections or additions submitted, the plans will be forwarded to the testing laboratory to determine the cost of the tests and the material to be submitted for testing.

(3) The manufacturer will then begiven shipping instructions for the required test samples and an estimate of the cost of the tests.

(4) Upon receipt of a check from the manufacturer for the estimated costs of the tests made payable to the United States Coast Guard, and of the required test samples, the equipment will be tested.

(5) A copy of the laboratory test report will be forwarded to the manufacturer and he will be advised if his material is approved under this subpart. If approved, any stipulations of the approval will be specified. This information will be published in the

FEDERAL REGISTER, and an approval certificate will be issued to the manufacturer.

[CGFR 56-39, 21 FR 9040, Nov. 21, 1956, as amended by CGFR 70-173, 35 FR 19966, Dec. 30, 1970]

§ 161.002-17 Equivalents.

(a) Where in this subpart it is provided that a particular fitting, appliance apparatus, or equipment, or type thereof, or test shall be provided or conducted, or that any particular arrangement shall be adopted, the Commandant may accept in substitution therefor any other fitting, apparatus, or equipment, or type thereof, of any other arrangement: *Provided*, That he shall have been satisfied by suitable trials that the fitting, appliance, apparatus, or equipment, or type thereof, or the arrangement is at least as effective as that specified in this subpart.

Subpart 161.004—Emergency Loudspeaker System

SOURCE: 21 FR 9042, Nov. 21, 1956, unless otherwise noted.

§ 161.004-1 Applicable specifications and other publications.

(a) The following specifications and other publications, of the issue in effect on the date emergency loudspeaker systems are manufactured, form a part of this subpart:

(1) National Bureau of Standards publication:

Handbook H28—Screw-Thread Standards for Federal Services (including supplement)

(2) Military specifications:

MIL-W-16878A (Navy)—Wire, Electrical (Insulated, High Temperature).

(3) A. S. T. M. Standard:

B117—Method of Salt Spray (Fog) Testing (Tentative).

(4) Underwriters' Laboratories, Inc., specification:

Standard for Fuses.

(5) Coast Guard regulations:

Electrical Engineering Regulations, CG-259 (46 CFR (Subchapter J) Parts 110 to 113, inclusive).

(b) Where the requirements in the specifications and other publications listed in this section conflict with the requirements in this subpart, the requirements in this subpart shall govern in all cases.

(c) Copies of the specifications and other publications referred to in this section shall be kept on file by the manufacturer, together with the certificate of approval.

(d) The National Bureau of Standards publication may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402. The military specifications may be obtained from the Bureau of Supplies and Accounts, Department of the Navy, Washington, D.C., 20350. The Coast Guard publications may be obtained from the Commandant, U.S. Coast Guard Headquarters, Washington, D.C., 20226. The A. S. T. M. specifications may be purchased from the American Society for Testing Materials, 1916 Race St., Philadelphia, Pa., 19103. The Underwriters' specifications may be purchased from the Underwriters' Laboratories, Inc., 207 East Ohio St., Chicago, Ill., 60611.

§ 161.004-2 Type.

The emergency loudspeaker system covered by this subpart is a reliable marine type audio system composed of microphone(s), duplicate amplifiers, speakers and a wheelhouse control cabinet. Power supplied from the ship's distribution system and shipboard interconnecting cable are excluded for the purpose of this specification. Alternate arrangements which conform to the performance requirements of this specification will be specifically considered for approval.

§ 161.004-3 Materials and workmanship.

(a) *Suitability.* All materials used shall be of the quality best suited for the purpose intended.

(b) *Materials covered by reference specifications.* Where specifications are referred to for a given material, it is intended to require that the quality of material used shall be at least equal to that covered in the reference specifications.

(c) *Departures from reference specifications.* The use of materials not conforming with or not covered by the reference specifications shall be noted on the drawings specified in § 161.004-7 and will be the subject of specific approval.

(d) *Protection against corrosion*—(1) *General.* In order to prevent deterioration due to corrosion, all fastenings, fittings, brackets, and other metallic parts shall be of an approved corrosion-resistant material or of a material treated in an approved manner to render it adequately resistant to corrosion.

(2) *Corrosion-resistant materials.* Silver, copper, brass, bronze, copper-nickel, certain copper-nickel alloys, certain aluminum alloys, and certain stainless steel alloys are considered satisfactory corrosion-resistant materials.

(3) *Corrosion-resisting treatments.* Sherardizing, galvanizing, zinc chromate base with enamel finish, and electroplating of cadmium, chromium, nickel, silver, or zinc when properly done and of sufficiently heavy coat, are considered satisfactory corrosion-resistant treatments. Other corrosion-resistant treatments shall be subject to specific approval.

(4) *Dissimilar metals.* In order to minimize the corrosive effect due to electrolytic action between dissimilar metals, contact between dissimilar metals shall be limited to those metals having small difference of electrolytic potential in the electro-chemical series.

(e) *Insulating material.* Material for the mounting of uninsulated live-metal parts shall be phenolic composition, coldmolded composition, or other material which is recognized as suitable for the particular application. Hard fiber may be used for insulating bushings, washers, separators, and barriers, but not as the sole support for uninsulated live-metal parts where shrinkage, current leakage or warpage may introduce a hazard. Small molded parts shall be so constructed that they will have adequate mechanical strength and rigidity to withstand the stresses of actual service.

(f) *Workmanship.* The workmanship shall be first class in every respect.

(1) *Soldering*—(i) *General.* All soldering shall be effected in a neat and workmanlike manner.

(ii) *Strength of soldered joint.* In general, soldering alone shall not be depended upon for a satisfactory connection, but where wires and terminals are joined to be soldered, the wires shall be hooked, wrapped around or otherwise mechanically secured to the terminals prior to soldering.

(iii) *Soldering flux.* Only pure resin or a mixture of alcohol and resin (or equivalent) shall be used as a flux.

§ 161.004-4 Requirements.

(a) *General.* (1) The principal purpose of the emergency loudspeaker system aboard passenger vessels is the transmission and reproduction of intelligible speech above the high noise levels encountered under emergency conditions aboard the vessel, particularly during the operation of abandoning ship. To meet this end, the emergency loudspeaker system shall have a flat sound output response within ±6 decibels for frequencies from 500 to 5,000 cycles per second with less than 10 percent overall distortion and provide a minimum sound level as specified in Table 161.004-4(a)(1) over all loudspeakers of the system when the microphone is spoken into at normal voice level. The system response curve for frequencies above 5,000 and below 500 shall drop uniformly. The system shall be a fire and damage resistant system located above the margin line except for certain below deck loudspeakers and designed to withstand the corrosive, humid, and vibratory ambient aboard ship. The system shall be capable of producing an attention signal with a distinctive note of about 1,500 cycles per second on each loudspeaker at sound levels specified in Table 161.004-4(a)(1). The system shall be operable approximately 30 seconds after turning on power. Duplicate amplifiers shall be provided and arranged for quick shift over at the wheelhouse master control station. The system shall enable an officer on the bridge to broadcast separately or collectively to the following stations: (1) Lifeboat stations, port; (2) lifeboat stations, starboard; (3) lifeboat embarkation stations, port; (4) lifeboat embarkation stations, starboard; (5) public spares used for passenger assembly stations; and (6) crew quarters. The system shall be controlled from a single location on the navigating bridge and shall permit two-way conversation with the navigating bridge from designated loudspeakers at lifeboat and embarkation stations.

TABLE 161.004-4(A)(1)—MINIMUM SOUND LEVEL REQUIREMENTS FOR LOUDSPEAKER SYSTEMS

[All values in decibels [1]]

Location	Ground noise level minimum	Signal level		Voice level	
		Above ground noise	Total	Above ground noise	Total
Lifeboat stations	80	20	[2] 100	15	[2] 95
Embarkation deck and exterior passenger assembly points	80	20	[2] 100	15	[3] 95
Interior passenger assembly points	75	20	[2] 95	15	[2] 90
Crew quarters	60	18	[3] 78	12	[3] 72

[1] 1The zero decibel level is defined as 0.0002 dynes per square centimeter.

[2] Measured at a distance of 10 feet from the loudspeaker and on the axis thereof.

[3] Measured in rooms with the doors to the passageways closed.

(2) The design of the system shall permit cable runs (not included in this specification) to the different loudspeaker groups to be widely separated. In addition, the distribution shall be such that a casualty to the port or starboard supply cabling to loudspeakers on boat and embarkation decks will render not more than half of the loudspeakers in the group inoperative.

(3) A variation in supply voltage of 10 percent concurrently with a supply frequency variation of 5 percent shall not reduce the output of any one speaker by more than 3 decibels.

(4) All components of the system shall operate successfully when tilted to an angle of 30 degrees in any direction from the normal position.

(5) "Grounding one or both sides" or "opening" or "shorting" of a lifeboat station or embarkation deck loudspeaker supply cable shall not reduce the output of any other loudspeaker by more than 3 decibels.

(b) *General design requirements (mechanical)*—(1) *Bulkhead mounting.* Enclosures designed for bulkhead mounting may be of either the surface or the flush type.

(2) *Ceiling mounting.* Enclosures designed for ceiling mounting may be of either the surface or the flush type.

(3) *Servicing.* All enclosures shall be designed to facilitate servicing the equipment contained therein.

(4) *Minimum metal thickness.* Units shall be so formed and assembled that they will have the strength and rigidity necessary to resist the abuse to which they are liable to be subjected without affecting adversely their performance. The wall thickness of metal enclosures shall be not less than the minimum values given in Tables 161.004-4(b)(4)(i) and 161.004-4(b)(4)(ii).

TABLE 161.004-4(b)(4)(i)

Use, or dimensions, of area involved	Minimum thickness of cast metal in inches
Area of 24 square inches or less and having no dimensions greater than 6 inches	1/8
Area greater than 24 square inches or having any dimensions greater than 6 inches	3/16
At a threaded cable entrance opening	1/4

TABLE 161.004-4(b)(4)(ii)

Maximum unsupported area of flat surface in square	Minimum thickness of metal	
	U.S.S. gage number of sheet steel	AWG number of non-ferrous metal
360	16	14
1,200	14	12
1,500	12	10
Over 1,500	10	8

(5) *Bolts, nuts, screws, and threads.* All bolts, nuts, screws and threaded parts shall comply with the following requirements:

(i) All threaded parts shall be of American National form in accordance with the Screw Thread Standards for

Federal Services, National Bureau of Standards Handbook H28.

(ii) All threaded parts used for securing complete component items to the supporting structure of any unit shall conform to the National Coarse or Fine Thread series.

(iii) All threaded parts for adjustment purposes shall, where possible, conform to either the National Coarse or Fine Thread series.

(iv) All tapped holes in metal shall have not less than two full threads in the metal.

(v) Holes in the walls of watertight enclosures for the purpose of providing means for attachment of parts, or for securing the cover and the like, shall not penetrate the total thickness of the enclosure wall. Suitable bosses shall be provided for this purpose in cast enclosures. Blind tapped welded buttons shall be used in sheet metal enclosures.

(6) *Locking devices.* All nuts and bolts used on moving parts or subject to vibration during operation, shall be securely locked in place by lockwashers on the nut end or by other approved means.

(7) *Serviceability.* Units shall be constructed with a view toward maximum accessibility for repair and replacement of components. All component parts shall be accessible and readily removable without disconnecting ship's cabling from the equipment.

(8) *Mounting of component parts.* All small component parts, such as resistors and capacitors which are mounted by their leads shall be mounted on terminal or connection boards. Slack shall be provided in the mounting leads to permit thermal expansion without stressing the components. Large and medium-large components shall be securely fastened by clamps. Long resistors shall be fastened at both ends. Ceramic or composition resistors which are secured by screws shall have pliable washers inserted under the screws to prevent undue stress on the resistors.

(9) *Clamps.* All electron tubes, ferrule type resistors, fuses and other plug-in items shall be secured with positive holding clamps and shall be capable of being easily released for replacement.

(c) *General design requirements (electrical)*—(1) *Wiring*—(i) *Hook-up wire.* Hook-up wire used in wiring of equipment covered by this specification shall be of stranded construction, and shall comply with Military Specification MIL-W-16878A (Navy) unless otherwise approved. Hook-up wire shall have adequate temperature rating, voltage rating mechanical strength and current-carrying capacity for the service.

(ii) *Lacing.* Wherever practicable, groups of two or more conductors shall be bundled and laced. Lacing shall not be so tight as to cause distortion of the conductor insulation. Within the structure harness laced cable packs of 20 conductors or more shall be suitably supported at each end and at least every 8 inches between ends.

(iii) *Sleevings or tape.* All cable forms connected between a fixed and a movable portion of an assembly shall be provided with sufficient slack and shall be covered with a protective sleeving or tape (of fire retardant, non-hygroscopic material) to eliminate the possibility of chafing or mechanical abrasion on the surface of individual conductors.

(iv) *Cable clamps.* Cable clamps shall be provided at frequent intervals along the length of all cable forms to secure cable runs against vibration or undue movement. Such clamps shall be adequately cushioned or of a design to prevent damage to conductor insulation.

(v) *Bushings.* Suitable smoothly rounded bushings shall be used in holes in sheet metal through which cable forms or conductors pass. Holes in other materials shall be smoothly rounded if not bushed.

(vi) *Wire terminals.* Wire ends connected to screw or threaded stud type terminals shall be terminated in suitable closed-end terminals of either the solderless or the solder type. Only one wire per wire terminal or connector shall be installed.

(vii) *Segregation of low level circuits.* Care should be taken to separate physically amplifier input circuits from power and output circuits. Terminal boards for ships cables shall be located so as to provide maximum separation between cables carrying low level circuits and all other cables.

(viii) *Color identification.* To facilitate servicing, hook-up wiring should be colored (or otherwise clearly marked) for ease of identification and these colors should be indicated on the appropriate wiring diagrams furnished with the equipment.

(ix) *Grounds.* The circuit wiring shall not cause a ground to be placed on the ship's distribution system.

(2) *Terminal boards and terminals.* (i) Terminal boards shall be provided for all external connections to an item of equipment.

(ii) Terminal boards for receiving ship's cables shall be secured to a fixed portion of an item of equipment and not to hinged panels or other movable members, which would require flexing of ship's wiring during normal operation or maintenance.

(iii) Terminal boards shall be of the screw type with suitable barriers between terminals. The design shall be such that terminals cannot rotate once they have been secured. Terminal boards to which two or more connections per terminal will be required shall be fitted with studs in lieu of tapped holes.

(iv) Closed end wire terminal lugs of either the solder or the solderless shall be used for all connections to terminal boards.

(3) *Shielding.* (i) The equipment design, construction and shielding (particularly of wiring and contacts) shall be such as to shield amplifier input circuits and low level contacts from the effects of stray electromagnetic and/or electrostatic fields and to reduce radio-frequency radiation or conduction from any part of the equipment. The noise level in the system should be a minimum of 50 decibels below rated output.

(ii) A grounded electrostatic shield between primary and secondary windings shall be provided for all power transformers used in the equipment.

(4) *Temperature rise.* Under normal operating conditions the temperature rise of any part of the equipment shall not exceed the values given in Table 161.004-4(c)(4) in an ambient temperature of 40° C.

TABLE 161.004-4(c)(4)

Material	Maximum temperature rise (°C.)
At any point on the exterior surface of an overall enclosure of non-combustible material.	40°.
Any point on a copper-oxide rectifier	15°.
On rubber or thermoplastic insulation	20.°
Any point on a selenium rectifier	35°.
On varnished cambric insulation	40°.
At any point on or within a terminal box or compartment.	40°.
On fuses	40°.
On fiber employed as electrical insulation	40°.
On Class A insulation	40°.
On a transformer enclosure	40°.
On Class B insulation	60°.
On phenolic composition employed as electrical insulation.	110°.
Sealing compound	[1] 15° less than melting point.
Capacitor, resistor, electronic tube, lamps	[1] 10° less than the temperature limit of the device.

[1] These are limiting temperatures, not temperature rises.

(5) *Bonding and grounding.* Exposed dead metal parts of enclosures for the equipment shall be metallically bonded and when installed shall be grounded to the ship's hull. Hinges in themselves are not considered satisfactory conducting means for bonding purposes.

(6) *Spacings.* Units shall provide reliably maintained spacings between uninsulated live parts, and between uninsulated live parts and non-electrical metal parts. The spacings between any uninsulated live part and (i) walls and cover of a metal enclosure, (ii) fittings for cable entrance, and (iii) metal pieces attached to a metal enclosure where deformation of the enclosure is liable to reduce spacings, shall be not less than those indicated in Table 161.004-4(c)(6)(i). The spacings between any uninsulated live part and (i) an uninsulated live part of opposite polarity, (ii) an uninsulated grounded part other than the enclosure, (iii) an exposed metal part which is insulated, and (iv) uninsulated live parts of the same polarity where a short-circuit would prevent normal operation shall be not less than those indicated in Table 161.004-4(c)(6)(ii). The spacings within snap switches, lampholders, and similar wiring devices shall

comply with the requirements of the appropriate standards for such devices.

TABLE 161.004-4(c)(6)(i)

Application	Minimum spacing in inches, through air and over surface		
	0-300 volts	301-600 volts	601-1,000 volts
Sheet-metal enclosures	½	¾	1¼
Cast-metal enclosures	¼	½	1

TABLE 161.004-4(c)(6)(ii)

Application	Minimum spacing in inches			
	0-150 volts	151-300 volts	301-600 volts	601-1,000 volts
Installation wiring terminals:				
Through air	¼	¼	¼	⅜
Over surface	¼	⅜	½	1
Other parts:[1]				
Through air	⅛	3/16	¼	5/16
Over surface	¼	⅜	½	1

[1] At fixed parts of rigidly clamped special assemblies of live parts and insulating separators, such as contact springs on relays, cam switches, etc., which are wired at the factory, the spacings may be less than those indicated in the table for parts other than installation-wiring terminals, but not less than 1/16 inch for 150 volts or less, not less than 3/32 inch for 151 to 300 volts, not less than ⅛ inch for 301 to 600 volts, and not less than 5/32 for 601 to 1,000 volts, through air and over surface.

(7) *Dielectric and insulation resistance characteristics*—(i) *Dielectric strength.* All electrical circuits except microphone and loudspeaker voice coil circuits, shall be capable of withstanding continuously for one minute a dielectric test of a closely sinusoidal 60-cycle alternating current at an R. M. S. value of twice rated voltage plus 1,000 volts applied between electrical circuits and between circuits and ground, except that for circuits operating at less than 50 volts, the test potential may be 500 volts. Loudspeakers shall be capable of withstanding a 150-volt D.C. voltage between voice coil and magnet structure while a signal voltage of value specified below is applied to the voice coil and warbled from 50 to 5,000 cycles per second in not less than 15 seconds. The leakage current shall not exceed 4 milliamperes (0.004 ampere). (Leakage current will be limited to a maximum value of 5 milliamperes (0.005 ampere) to prevent destruction of the voice coil.)

(ii) *Insulation resistance.* The insulation resistance of electrical circuits following the dielectric strength test shall not be less than 10 megohms at 500 volts D. C. and at room temperature.

(8) *Overload protection.* Protective devices shall be provided within the equipment for primary circuits and such other circuits as required for protection of the equipment from damage due to overload, excessive heating, etc.

(i) *Design.* All parts which are likely to carry an overload, due to malfunction of circuits, or other deleterious effects, shall be designed to care for such a load; where this is impracticable, circuit breakers, relays, fuses, or other suitable devices shall be included to protect them. The use of secondary protective devices shall be held to a minimum consistent with good marine practice. Each power input line shall be protected at a physically centralized point, and protective devices shall be located in each side of the input lines.

(9) *Switch and relay circuits.* Disconnect, transfer and relay switching of all power, input and output circuits shall be accomplished by opening both sides or all phases of the circuits. Single line switching will be acceptable for control circuits only.

(d) *Electrical component parts*—(1) *General.* Relays, buzzers, indicating lamps, resistors, potentiometers, capacitors, transformers, electron tubes, terminal boards, fuses, switches, etc. shall be suitable for the purpose intended and in accordance with this subpart and applicable specifications.

(2) *Relays and other electro-magnetic devices*—(i) *General.* Units shall operate satisfactorily and shall retain their setting in any position of the equipment under any service condition. Contacts shall make firm low resistance contact and shall be noncorrosive and, where practicable, of the self-wiping type. Relays shall be readily accessible for inspection, cleaning, and adjustment unless of the sealed type.

(ii) *Coils.* All coils shall be insulated and vacuum impregnated with a water-resistant insulating material to withstand conditions of heat, oil or moisture that may be encountered in service.

(iii) *Under and over voltage.* All electromagnetic devices shall operate satisfactorily at both 80 percent and 110 percent of normal voltage.

(iv) *Number of operations.* All relays whose contacts control power of less than 25 watts shall be capable of 50,000 operations at the rate of 120 operations per minute without requiring any repair or servicing. All relays whose contacts control power of 25 watts or more, and other electromagnetic devices shall be capable of 10,000 operations at the highest rate and under normal load conditions at which they are likely to be operated in service use, but in no case less than two operations per minute, without repairing or servicing.

(3) *Indicating lamps.* (i) Lamps shall be selected to give long life under service conditions. Where possible lamps shall be operated at less than rated voltage.

(ii) Lampholders shall, where possible, be of a type in which the circuit of the lamp cannot be interrupted due to vibration or to alternate heating and cooling. Bayonet or telephone type lampholders are considered preferable for miniature type lamps. Lampholders shall be of a type to permit changing lamps without the aid of tools.

(4) *Resistors and potentiometers.* All resistors shall be capable of continuously dissipating, without damage, 50 percent more power than the maximum they will dissipate in normal use of the equipment in an ambient of 40° C. Potentiometers or continuously variable resistors employed shall be of a wire-wound construction.

(5) *Capacitors.* (i) Capacitors shall be rated at 25 to 33 percent higher than the peak voltages encountered in the circuit.

(ii) Capacitors shall be hermetically sealed in such a manner as to remain moisture-proof over a temperature range of 0°C. to the maximum operating temperature.

(iii) The use of electrolytic capacitors is prohibited.

(6) *Transformers.* Transformers shall be rigidly mounted and enclosed in sealed metal cases and protected against failure due to prolonged exposure to humid salt atmosphere by impregnation under vacuum.

(7) *Electron tubes and sockets.* (i) Electron tubes shall be selected to give long life under service conditions.

(ii) All electron tubes shall be of commercially available types. Tubes shall be considered commercially available when manufactured by more than two tube manufacturers.

(iii) Series arrangement of cathode heating elements is not permissible.

(iv) Artificially cooled electron tubes shall not be used.

(v) Electron tube and capacitor sockets shall be of the single unit type of a material resistant to moisture absorption. Contact springs shall have positive contact and positive action. Socket contacts shall be silver plated phosphor bronze or beryllium copper. Sockets shall securely retain tubes under all service conditions, or shall be provided with suitable tube clamps.

(8) *Fuses.* All fuses shall be constructed in accordance with Underwriters' Laboratories, Inc., Standard for Fuses, and shall be marked with the approval label of Underwriters' Laboratories, Inc.

(9) *Switches.* (i) The handles or keys of limited arc rotary type selector switches shall be provided with mechanical stops to prevent undue strain on the switch handle and shaft. The fixed portion of rotary switches shall be prevented from rotating by means other than friction.

(ii) Switch knobs and handles shall be positively secured to their shafts and shall not rely on friction of a set screw for such means of securing. This shall be accomplished by using a noncircular shaft with a mating hole in the knob or handle. Set screws holding the knob or handle to the shaft shall thread directly into the shaft.

(iii) Switches shall be capable of 40,000 cycles of operation at the highest rate at which they are likely to be operated in service use without repairing or servicing.

(10) *Batteries.* The use of batteries is prohibited.

(11) *Spare parts and test equipment.* Spare parts shall be adequate for the purpose and as a minimum shall include:

1—Each type cone or diaphragm assembly for loudspeakers or 1 each driver assembly.
1—Microphone unit.
1—Each type relay, switch.
2—Each type resistor and condenser.
100 percent—Electron tubes, fuses, and indicating lamps.
1—A test voltohmmeter having necessary ranges to measure the voltages occurring in the equipment.

(e) *Wheelhouse control station and bridge wing microphones.* The control station located in the wheelhouse shall contain all the necessary equipment to cause the system to be placed in operation, sound the attention signal, permit a person to talk to all or any of the stations listed in paragraph (a) of this section, change from one amplifier to another, and to shut down the loudspeaker system.

(1) *Microphones.* The microphone at the control station shall be of the fixed type rather than portable. Additional portable microphones equipped with a press to talk switch may be furnished for bridge wing locations provided these microphones may be switched out of the system at the control station when the master microphone is in use. Microphones shall be watertight and of the magnetic type.

(2) *Cabinet.* The cabinet shall be of drip-proof metal construction or better.

(3) *Talk-back circuit.* When a particular talk-back station "calls in" a buzzer and an indicating light at the control station shall so indicate. The buzzer shall indicate only momentarily; however, the indicating light shall remain lighted until the call is answered. A switch to silence the buzzer may be employed, in any case the buzzer shall be silenced when the talk-back selector switch is closed. Selection between "talk" and "listen" at the wheelhouse control panel shall be provided by a two-position switch with maintaining contact in the "listen" position and momentary contact in the "talk" position.

(4) *Other equipment.* The wheelhouse master control station shall also contain the following items of equipment in a convenient arrangement for operation:

(i) Speaker group switch(es);
(ii) Attention signal switch;
(iii) Talk-listen switch;
(iv) Power "on-and-off" switch;
(v) White lensed power "on" indicating lamp;
(vi) Amplifier selector switch;
(vii) A meter to indicate signal or voice output level; and,
(viii) Volume control for the wheelhouse speaker.

(f) *Amplifier equipment and signal generator*—(1) *General.* Duplicate amplifiers shall be provided. Amplifier equipment shall include the components necessary to cause, when energized, the signal received from the microphone to be brought to the proper level for transmission to the speakers. Each amplifier shall contain its own tube plate and filament power supply.

(2) *General construction.* All components of the amplifier and signal generator shall be housed in metal enclosures of drip-proof construction or better. All openings shall be constructed so as not to permit the passage of a rod larger than ½ inch in diameter through the opening.

(3) *Personnel protection.* Provision shall be made wherever possible to prevent personnel from accidentally coming in contact with electrically energized parts. Except for circuits of 24 volts or less, a manually operated switch shall be provided to de-energize all circuits within an enclosure during servicing.

(4) *Mounting of controls.* All switches, operating controls, test controls, and meters shall be mounted on the front of the enclosure(s) and shall be visible and accessible without requiring the opening of covers or doors.

(5) *Accessibility.* Terminals of all components and all electrical connections within the enclosure shall be accessible for test purposes or servicing without requiring the use of tools, removal of equipment or disconnecting of cables.

(6) *Ventilation.* The enclosures shall afford only natural ventilation.

(7) *Standby operation.* The circuit arrangement shall be such that with either amplifier in operation the other amplifier shall be in a standby condi-

tion, i.e., ready for operation within 2 seconds after being switched in.

(8) *Amplifier phasing.* To insure proper operation in the event that amplifiers are operated in parallel, each amplifier shall be so wired that like-marked input and output terminals will be in corresponding electrical phase relationship, whenever a signal is being transmitted through the amplifier.

(9) *Grounds.* All grounds within an enclosure shall be made to a common bus. In no case shall a ground connection be made directly to the chassis.

(10) *Stability.* The amplifier shall show no evidences of instability or oscillation when operated at full gain with amplifier input either short or open-circuited and with amplifier output either short or open-circuited or when feeding pure capacitive loads of any capacity up to 1 microfarad.

(11) *Volume compressor.* A volume compressor shall be incorporated as an integral part of the amplifier. A suitable switch shall be provided to permit switching the compressor in or out of the amplifier circuit. The compressor shall act to provide at least 12 decibels more output than when operated without compression at a signal input level 40 decibels below that required to produce rated output. At the input level required to produce rated output, the amplifier output shall not vary in excess of plus or minus 1 decible with the compressor in or out.

(12) *Overload limiter.* An overload limiter shall be incorporated as an integral part of the amplifier. The limiter shall act to prevent amplifier output in excess of 2 decibels for an increase of 12 decibels over the input signal required to produce rated output and under these conditions the overall loudspeaker system harmonic distortion shall not exceed 15 percent.

(13) *Overload capacity.* With the signal generator input signal of the value 6 decibel lower than required to produce rated output, the amplifier shall be capable of operating continuously for a period of 30 minutes into a short circuit load across its output terminals without lowering amplifier gain, affecting ability to produce rated output power, or producing other deleterious effects.

(14) *Signal generator.* The signal generator shall be designed to operate in conjunction with the amplifier so that the connected speakers are caused to emit a signal raucous in nature for the purpose of arresting attention. The fundamental frequency of this signal should be approximately 1,500 cycles per second.

(15) *Test facilities.* Test jacks shall be provided on each amplifier chassis to obtain an indication of cathode current for each amplifier stage by means of a test voltohmmeter supplied with the spare parts and tools required by § 161.004-7(a)(4). By means of a switch on the amplifier cabinet it shall be possible to determine performance of the standby amplifier by connecting the signal generator to the input and a dummy load to the output, and to obtain output indications on the test jacks with the voltohmmeter.

(g) *Loudspeaker equipment*—(1) *General design.* Loudspeakers shall be designed for sound level, mounting and enclosure requirements consistent with their location on the vessel. Sound level requirements for various speaker locations are found in Table 161.004-4 (a) (1). Speech intelligibility is of primary importance in the design of loudspeakers.

(2) *Enclosures.* Loudspeaker equipment in locations exposed to the weather shall be housed in watertight corrosion-resistant enclosures. The construction of all loudspeakers shall ensure drainage for all throats, chambers and recesses to prevent the retention of any trapped moisture or condensation which may enter the enclosure of the loudspeaker mounted with the sound axis in any position between zero degrees and minus 45 degrees elevation relative to the horizontal position.

(3) *Magnet structure.* (i) All loudspeaker fields shall be of the permanent magnet type.

(ii) The magnet structure shall be treated to provide resistance to corrosion, and to prevent the formation of corrosion products in the air gap.

(iii) Minimum air gap clearance on either side of the voice coil assembly shall be 0.007 inch.

(iv) Removal of the magnet structure as a unit together with the voice coil and diaphragm assembly shall not expose the magnetic gap, nor require removal of such parts as a transformer or a terminal board.

(4) *Voice coil and diaphragm assembly.* (i) All voice coil and diaphragm (or cone) assemblies shall be replaceable readily without necessitating cementing or soldering and without disconnecting the ship's wiring or dismounting the enclosure.

(ii) Diaphragms and cones of all loudspeakers shall be of molded phenolic.

(iii) Materials used for gaskets, cone supports shall be impregnated as necessary to render them impervious to moisture and to provide resistance to corrosion.

(iv) The use of dissimilar metals for the voice coil winding and the voice coil lead-in wires shall be avoided.

(v) No portion of a cone shall contain exposed rubber or other material which will tend to change its characteristics when placed in an atmosphere containing salt, moisture or oil.

(5) *Sound level adjustment.* Each loudspeaker shall incorporate an adjustment device by means of which the output level can be varied over a minimum range of 15 decibels in a minimum of three approximately equal steps.

(6) *Switch or pushbutton for talk-back loudspeakers.* Switches or pushbuttons employed in the talk-back "call-in" circuit shall be either integral with or nippled to the talk-back loudspeaker housing or located adjacent to the loudspeaker, and shall be of the momentary contact spring-return-to-off type.

[21 FR 9042, Nov. 21, 1956, as amended by CGD 79-165a, 45 FR 64189, Sept. 29, 1980]

§ 161.004-5 Tests.

(a) *System tests.* With the system setup in the testing laboratory to simulate as nearly as practicable a shipboard installation the following system tests shall be conducted:

(1) *General inspection.* The equipment shall be given a thorough inspection to determine that the equipment conforms to the requirements of this specification. Each unit of the equipment, each sub-assembly and each part shall be examined as necessary to determine conformance with the requirements of this specification with respect to material, finish, workmanship, fit, construction, clearances, dimensions, identification, markings, nameplates and instructions. This general inspection shall include a check of all operating controls, circuit functions, test facilities and adjustments, as applicable.

(2) *Electrical operating test.* The system shall be energized and subjected to an operating test to determine qualitatively the proper functioning of the components including all operating controls. The system shall be maintained at rated output using the signal generator input a continuous period of 100 hours in an ambient temperature of 40° C. rated system output is defined as a sound level of 100 decibels, 95 decibels, and 78 decibels at a distance of 10 feet on the axis of exterior, interior passenger assembly, and crew-quarter loudspeakers respectively obtained with signal generator input and with one amplifier and all speaker circuits in operation.

(3) *Temperature rise.* The equipment shall be energized at rated voltage and frequency. All power consuming components such as amplifiers, signal generators, relays and lights shall be energized as necessary to simulate actual operating conditions corresponding to maximum heat generation. For this purpose, operating amplifier equipment shall be driven at rated output employing the signal generator input. The test shall be conducted at an ambient temperature of 40° C. temperature readings of "hot-spots" and component parts shall be taken after thermal equilibrium has been reached. (See § 161.004-4(c) (4) for temperature limits.)

(4) *Overall frequency response.* An overall frequency response curve for the microphone, amplifier and one of each type loudspeaker shall be determined with rated supply voltage and frequency, with the amplifier gain control and with the loudspeaker sound level adjustment set for rated system output. A variable frequency pure tone signal of 100 dynes per square centimeter ¾ inch from the microphone ring shall be varied from 50 to 10,000 cycles per second while the

response in decibels 10 feet away from and on the axis of each speaker is measured to determine compliance with § 161.004-4(a). Overall system harmonic distortion shall be determined at several points during this frequency run. These response curves shall be determined with the microphone and loudspeaker isolated in anechoic chambers (or equivalent). If the anechoic chamber is of such design as to prohibit measurements at 10 feet as specified above, measurements may be made at a minimum distance of 5 feet and scaled to 10 feet by using the inverse square law.

(5) *Variable voltage and frequency.* The supply line voltage and frequency shall be simultaneously varied 10 percent and 5 percent respectively up and/or down to determine that the output of any one loudspeaker is not lowered by more than 3 decibels.

(6) *Humidity test.* The amplifier (including the wheelhouse control station) shall be subject to the following humidity test. With the equipment adjusted for rated output, but not operating, the amplifier shall be subjected to a relative humidity of 95±5 percent and a temperature of 40°±2° C. continuously for 2 hours. At the end of the 2-hour period, and under the humidity conditions specified above, without adjustment the amplifier shall be capable of rated output within ±1 decibel. The equipment shall be energized only for the period of time necessary to reach temperature equilibrium at which time it shall be deenergized and subjected to an additional 4-hour humidity test at the conditions specified above. Immediately upon completion of this test and without adjustment the amplifier shall be capable of rated output within ±1 decibel for a period of one hour. The amplifier shall be carefully examined in detail to detect evidence of physical degradation, such as corrosion of metal parts, distortion of plastic parts, insufficient lubrication on moving parts, or deleterious effects on performance.

(7) *Vibration test.* (i) Vibration tests shall be made on any device capable of performing the tests specified in this subparagraph. Where the size of the unit prohibits its being vibration tested as a whole, the components judged to be most likely to fail may be tested. Means shall be provided for measuring and controlling the direction of vibration and adjusting the frequencies to keep them within the specified limits. The test described in this subparagraph shall be made along each of the three principal axes separately with the amplitude specified. Amplitude is defined as one half of the total excursion.

(ii) The vibration frequency shall be varied from 5 cycles per second (or the resonant frequency of the equipment if this is below 5 cycles) to 23 cycles per second in discrete frequency intervals of one cycle per second. At each integral frequency, the vibration shall be maintained for 3 minutes. The change from one frequency to the next shall be made slowly and uniformly. Tests shall be made at a table amplitude of 0.030 inch ±0.006 inch. The amplification of vibration of the equipment at any frequency required herein shall not be such that observation operation or adjustment of the equipment under test will be impossible or difficult during the test. When this test is completed the equipment shall be vibrated for a period of 2 hours at any frequency between 5 (or the resonant frequency of the equipment if this is below 5 cycles) and 23 c.p.s., on the axis selected by the test engineer, which observation and measurement made during the previous test showed may be the condition most likely to cause failure. At the completion of this test the equipment shall be examined to determine that no looseness in the mechanism nor damage to any part has resulted from the vibration and also that the performance of the equipment has not materially changed.

(8) *Ground, open, and short test.* With the equipment in its normal operating condition, it shall be demonstrated that "grounding one or both sides" or "opening" or "shorting" of a lifeboat station or embarkation deck loudspeaker supply cable will not reduce the output of any other loudspeaker by more than 3 decibels.

(9) *Special additional tests.* In cases where a study of the design of a system discloses additional features

likely to effect reliability of operation or other desirable characteristics, suitable additional tests shall be made as necessary.

(b) *Salt-spray test.* One of each type of emergency loudspeaker system equipment, such as loudspeakers, pushbuttons, etc., designed for locations exposed to the weather shall be subjected to the following salt-spray test: The equipment shall be mounted in the normal operating position and subjected to a 20 percent salt-spray test for 200 hours under conditions specified in A.S.T.M. specification B117, Method of Salt-Spray (Fog) Testing (Tentative). Tested equipment shall have no deleterious results affecting performance. At the end of the test period the equipment shall be disassembled, washed in fresh water, dried, examined and reassembled.

(c) *Watertightness test.* One of each type of watertight equipment shall be subjected to a stream of water from a hose (not less than one inch in internal diameter) under a head of about 35 feet, and from a distance of about 10 feet and for a period of about 5 minutes. The hose nozzle should be adjusted to give a solid stream at the enclosure. After the test the exterior should be dried and the enclosure opened and examined for leaks.

(d) *Amplifier overload.* The amplifier shall be subjected to a 30 minute short circuit test as prescribed in § 161.004-4 (f)(13).

(e) *Microphone tumbling test.* One of each type microphone shall be subjected to a tumbling test of 500 revolutions in a standard rotary tester with a 16-inch drop. The floors of the rotary tester shall be of 3/16-inch thick masonite sheet (Brinell hardness 11 to 13), backed by wood. The performance of the microphone shall not be affected by this test.

§ 161.004-6 Marking.

(a) *General.* All equipment shall be provided with permanent nameplates as necessary to assure proper operation and/or adjustment of the equipment in service.

(b) *Coast Guard approval number on enclosures.* The enclosure for each major component of an approved system, i.e., master wheelhouse control station, amplifier, and speakers, shall have affixed a permanent nameplate giving the name of manufacture, Coast Guard approval number assigned, and the drawing and alteration numbers. Additional identification, such as model or type designation, may also be given.

(c) *Operating instruction plate.* A permanent instruction plate containing basic operating instructions in letters not less than one-eighth inch high shall be provided on the front of the wheelhouse master control station. The instruction plate shall be in sufficient detail to enable a person unfamiliar with the equipment to start, operate and secure the equipment.

(d) *Terminal boards.* All terminal boards shall be marked in a clear and permanent manner to show the designation of each terminal in accordance with markings assigned to the equipment wiring diagram.

(e) *Marking of parts.* Nameplates or other suitable markings shall be provided to identify each control handle and position, indicating light, pushbutton, meter, etc., located on the enclosures for the system. Parts, such as transformers, capacitors, resistors and relays, shall be identified by markings both on the part (if practicable) and adjacent to the part on the chassis or structure on which the part is mounted. The marking shall be that designation assigned on the associated wiring diagram, and shall be clearly and indelibly made. Electron tube and socket identification shall be marked adjacent to each tube socket on the tube side of the chassis or supporting structure.

(f) *Instructions.* A bound instruction book should be provided with each system. This book should contain a list of equipment, table of salient features of the system, installation and operating instructions, and procedure for adjustment, tests and maintenance. Overall schematic and equipment connection diagrams should be included as well as resistance and voltage tables and a spare parts list.

§ 161.004-7 Procedure for approval.

A party, whether or not this party is the manufacturer of all the components of the system, desiring U.S. Coast Guard approval of a complete Emergency Loudspeaker System should follow the steps listed below unless directed otherwise by the U. S. Coast Guard:

(a) *Submission of materials, letter, drawings, etc.* A letter, accompanied by complete drawings (in triplicate) of the system, requesting approval should be submitted. The letter should be addressed to—Commandant (MMT), U.S. Coast Guard, 1300 E Street NW., Washington, D.C. 20226. The drawings should include a complete schematic diagram, a complete connection wiring diagram and detail assembly drawings with material lists of the equipment.

(1) *Complete schematic diagram.* A complete electrical schematic diagram of the system shall be submitted representing clearly the operation of each component and the proper inter-connections between components.

(i) A thin broken line shall be used to represent the boundaries of each separate piece of equipment; all terminals to which external connections are made shall be shown within these boundaries, with their appropriate numbers and markings.

(ii) Each component part, such as resistor, capacitor, relay, etc., shall be given an unique designation.

(iii) A list giving electrical rating and manufacturer's name and model number for each designated component shall be included with the schematic for checking purposes.

(iv) Major assemblies, such as amplifiers and signal generators, for which a separate schematic diagram is supplied, may be represented by a block with terminals shown and appropriately marked.

(v) The schematic wiring of a component which appears several times in the system need to be shown only once; blocks with terminals shown and marked will suffice for the remaining identical components.

(vi) A system of differentiating between audio and control circuits, such as one employing heavier weight lines for audio circuits, shall be employed.

(2) *Connection wiring diagrams.* Separate wiring diagrams shall be submitted for each major component, such as wheelhouse master control station, amplifier, etc. Wiring diagrams for components such as loudspeakers and microphones may be included in their respective assembly drawings.

(i) Wiring diagrams shall show all component parts in their correct relative physical location, with terminals clearly shown and marked, and shall show all wiring between component parts.

(ii) The color code of all wires shall be indicated. Appropriate notes shall designate wire size and type.

(iii) Designations of component parts shall correspond to those assigned on the schematic diagrams.

(3) *Equipment assembly drawings.* Assembly drawings shall be submitted for each major component of equipment.

(i) Assembly drawings shall contain sufficient views in plan, elevation and cross section drawn to scale to show clearly the details of design, construction and assembly of the equipment.

(ii) All parts shall be identified as to material and finish (if any). Standard purchase items such as electron tubes, resistors, etc., may be identified by manufacturer's name and drawing and/or catalog number. The reference designations assigned to the schematic diagram shall be included as additional identification of each part.

(4) *List of spare parts and tools.* A list of spare parts and tools to be furnished with the system shall be submitted.

(b) *Testing of equipment.* After the material submitted as required in paragraph (a) of this section is complete to the satisfaction of the U.S. Coast Guard the tests indicated in this specification shall be conducted on the equipment at the National Bureau of Standards or at a testing laboratory designated by, but at no expense to, the U. S. Government. Receipt of a deposit check made payable to the U. S. Coast Guard in the amount estimated by the National Bureau of Standards, is required before tests may be conducted at the National Bureau of Standards. If the deposit exceeds the final cost of the tests, the difference will be returned to the manufacturer; and if the deposit is insufficient to cover the final cost of the tests, the manufacturer will be billed for the additional cost.

(1) Equipment to be submitted for tests need not include the total number of speakers for which the system is designed provided representative dummy loads are furnished for the speakers in such number to permit operation of the system under all shipboard installation (simulated) requirements as specified in § 161.004-4 and testing as specified under § 161.004-5. At least one of each type of microphone, wheelhouse control station, signal generator, amplifier and loudspeaker should be furnished in addition to the other equipment, such as spares, interconnecting cable, dummy loads, etc., that may be deemed necessary by the Coast Guard, the testing laboratory, or by the party submitting the equipment for approval. The amplifier equipment submitted for certification tests shall be of such a power rating as to provide the necessary sound coverage specified under Table 161.004-4(a)(1) when supplying the equivalent of a minimum of 25 loudspeakers, at least 10 of which shall meet the requirements for lifeboat station and embarkation deck locations.

(c) *Approval by the U.S. Coast Guard.* When the emergency loudspeaker system is approved by the Commandant of the U. S. Coast Guard, after consideration of the results of investigations and tests covered in paragraph (a) of this section this approval will be published in the FEDERAL REGISTER and an approval certificate issued.

Subpart 161.006—Searchlights, Motor Lifeboat, for Merchant Vessels

SOURCE: CGFR 49-43, 15 FR 127, Jan. 11, 1950, unless otherwise noted.

§ 161.006-1 Applicable specifications.

(a) The following specifications, of the issue in effect on the date motor lifeboat searchlights are manufactured, form a part of this subpart:

(1) Navy Department specifications:

42S5—Screws, machine, cap and set, and nuts.

43B11—Bolts, nuts, studs, and tap-rivets (and materials for same).

(2) Federal specification:

QQ-B-611—Brass, Commercial; bars, plates, rods, shapes, sheets, and strip.

(3) A.S.T.M. standards:

B117-44T—Method of salt spray (fog), testing (tentative).

B141-45—Specification for electrodeposited coatings of nickel and chromium on copper, and copper-base alloys.

(4) Underwriters' Laboratories, Inc.:

Standard for flexible cord and fixture wire, third edition, October, 1935.

(b) Copies of the above specifications shall be kept on file by the manufacturer, together with the approved plans and certificate of approval.

§ 161.006-2 Type.

(a) The motor lifeboat searchlight shall be of the incandescent type equipped with a lamp of approximately 90 watts of proper voltage for use with the electric power installation of the lifeboat, usually a 12-volt radio storage battery.

§ 161.006-3 Materials and workmanship.

(a) *Materials.* The materials shall be of best quality and suitable in every respect for the purpose intended. All materials shall be corrosion resistant. The use of acid flux in making joints shall not be permitted.

(b) *Workmanship.* The workmanship shall be first class in every respect.

§ 161.006-4 Requirements.

(a) *Corrosion-resisting materials.* Silver, corrosion-resisting steel, copper, brass, bronze and copper-nickel alloys are considered satisfactory corrosion-resistant materials within the intent of this subpart.

(b) *Searchlight parts.* The motor lifeboat searchlight shall, in general consist of the following parts:

Yoke and pedestal.
Housing.
Front door.
Reflector.
Lamp socket.
Supply cable.

(c) *Weight and dimensions.* The height of the motor lifeboat searchlight shall not exceed 19 inches and the weight shall not exceed 16 pounds, unless otherwise approved.

(d) *Wiring.* The motor lifeboat searchlight shall be wired with a five-foot length of rubber-jacketed hard service flexible cord, Underwriters' Laboratories, Inc., Type S, or equivalent, of a size not less than No. 16 AWG. At the point where the cable enters the searchlight, a waterproof entrance bushing with packing gland and cord grip shall be provided.

(e) *Lamp and socket.* The motor lifeboat searchlight shall be provided with a lamp of not less than 80 watts nor more than 100 watts, and a suitable lamp socket. Means shall be provided for adjusting and securing the lamp socket at any position between the focal point and a point not less than ¼ inch away from the focal point in either direction in the axis of the beam.

(f) *Housing.* The housing shall be constructed of brass, Federal Specification QQ-B-611, Composition E, copper alloy, or other suitable corrosion-resistant material as approved, of a thickness not less than No. 20 AWG. The housing shall be capable of free movement of at least 60 degrees above and 20 degrees below the horizontal, and of a free movement of 360 degrees in a horizontal plane. It shall be possible to lock the barrel in any desired position, vertically or horizontally, without the use of tools. A sturdy metal hand grip shall be provided at the back of the housing for housing-adjusting purposes.

(g) *Front door.* A front door shall be attached to the housing in such a manner that it can be readily opened or removed, without the use of tools, for the purpose of relamping. The door, when closed, shall be waterproof. Clear front door glass shall be used.

(h) *Reflector.* The reflector shall be paraboloidal. It shall be constructed of brass, Federal Specification QQ-B-611 Composition E, finished and with electroplated coatings of nickel and chromium in accordance with A.S.T.M. Specification B141-45, Type K. C., or as otherwise approved. The reflector shall furnish a minimum average illumination of 100 foot candles, when measured as specified in § 161.006-5 (b) (2).

(i) *Yoke and pedestal.* The yoke and pedestal shall be of rugged construction. The pedestal shall be suitable for bolting to a flat surface with not less than four ⅜-inch diameter bolts.

(j) *Beam spread.* The beam shall be at least 60 feet in diameter at 200 yards. The edge of the beam shall be defined as a point at which the intensity of the light is 10 percent of the maximum intensity.

(k) *Bolts, nuts, and screws.* Bolts and nuts shall conform to the requirements of Navy Department Specification 43B11. Screws shall conform to the requirements of Navy Department Specification 42S5.

(l) *Name plate.* The motor lifeboat searchlight shall be provided with a permanent metallic name plate giving the name of manufacturer, type designation, and drawing number.

§ 161.006-5 Sampling, inspections and tests.

(a) *General.* Motor lifeboat searchlights specified by this subpart are not inspected at regularly scheduled factory inspections of production lots, but the Commander of the Coast Guard District may detail an inspector at any time to visit any place where such searchlights are manufactured to check materials and construction methods and to conduct such tests and examinations as may be required to satisfy himself that the searchlights are being manufactured in compliance with the requirements of this specification and with the manufacturer's plans and specifications approved by the Commandant.

(b) *Methods of test*—(1) *Waterproof test.* The searchlight shall be subjected for 5 minutes to a stream of water under a head of approximately 35 feet from a hose not less than 1 inch in diameter from a distance of approximately 10 feet. The hose nozzle shall be adjusted to give a solid stream at the enclosure. No leakage shall occur in this test.

(2) *Beam candlepower.* All light except that produced from the searchlight under test shall be excluded from the room in which measurements are made. The searchlight shall be operated at rated voltage with a seasoned

lamp as specified in § 161.006-4(e). Measurements of beam candlepower shall be made at the corners of a 6-inch square located in the center of the beam at a distance of 32 feet immediately in front of the searchlight.

(3) *Corrosion resistance.* The searchlight shall be subjected to a 200-hour salt spray test in accordance with A. S. T. M. Standard B117-44T. There shall be no evidence of corrosion that will be detrimental to the operation of the searchlight.

(4) *Heat run.* The searchlight, completely assembled, shall be operated continuously for 2 hours at rated voltage following which the waterproof test shall be conducted. This cycle shall be repeated 3 times. The ambient temperature shall be approximately 25° C. The water stream shall be from an ordinary cold water tap.

§ 161.006-6 Procedure for approval.

(a) *General.* Motor lifeboat searchlights are approved only by the Commandant, United States Coast Guard, Washington, D.C., 20226. Correspondence relating to the subject matter of this specification shall be addressed to the Commander of the Coast Guard District in which the factory is located.

(b) *Manufacturer's plans and specifications.* In order to obtain approval of motor lifeboat searchlights, submit detailed plans and specifications, including a complete bill of material, assembly drawings, and parts drawings descriptive of the arrangement and construction of the device, to the Commander of the Coast Guard District in which the factory is located. Each drawing shall have an identifying drawing number, date, and an identification of the device; and the general arrangement for assembly drawing shall include a list of all drawings applicable, together with drawing numbers and alteration numbers. The manufacturer will be advised whether or not the drawings and specifications appear satisfactory or what corrections appear necessary and then he may proceed with the construction of the pre-approval sample in accordance therewith. The pre-approval sample, together with four copies of the plans and specifications corrected as may be required, shall be forwarded to the Commandant via the Commander of the Coast Guard District in which the factory is located for inspection and tests. The cost of the tests is to be borne by the manufacturer.

Subpart 161.008—Flashlights, Electric, Hand, for Merchant Vessels

Source: CGFR 49-43, 15 FR 128 Jan. 11, 1950, unless otherwise noted.

§ 161.008-1 Applicable specifications.

(a) The following specification, of the issue in effect on the date hand electric flashlights are manufactured, forms a part of this subpart:

(1) Federal specification:

W-B-101—Batteries and Cells; Dry.

(b) Copies of the specification referred to in this section shall be kept on file by the manufacturer, together with the approved plans and certificate of approval. They shall be kept for a period consisting of the duration of the approval and 6 months after termination of approval. The Federal specifications may be purchased from the Business Service Center, General Services Administration, Washington, D.C. 20407.

[CGFR 49-43, 15 FR 128, Jan. 11, 1950, as amended by CGFR 49-43, 15 FR 871, Feb. 17, 1950; CGFR 65-16, 30 FR 10899, Aug. 21, 1965]

§ 161.008-2 Sizes.

The following sizes are covered by this specification:

Size No. 2—Two-cell
Size No. 3—Three-cell

[CGFR 70-143, 35 FR 19966, Dec. 30, 1970]

§ 161.008-3 Materials and workmanship.

(a) *Materials.* All materials used in the construction of the flashlights shall be of a quality suitable for the purpose intended and shall conform to the requirements specified in this subpart.

(1) *Plastic.* Plastic, when used, shall be from a suitable thermoplastic or thermosetting material imbedded with a suitable impregnated fabric or fiber filler. The impact strength (Izod test) shall be at least 3.0 foot pounds per

inch of notch. The plastic shall be so molded as to produce a dense solid structure, uniform in texture, finish and mechanical properties. It shall be free from warpage, cracks, chipped edges or surfaces, uneven surfaces due to failure to fill out in the mold, burrs, projecting ridges at the dividing line of the mold, and evidence of porosity inclusive of areas adjacent to metal inserts.

(2) *Other materials.* The types of other permitted materials are covered in §§ 161.008-4 and 161.008-5.

(b) *Workmanship.* Workmanship shall be first class in every particular. Flashlights shall be of sturdy construction, and free from mechanical, electrical or other imperfections or defects which materially affect appearances or which may affect serviceability.

(1) Threaded parts shall be smooth and close fitting and shall be capable of being easily moved by hand relative to each other; threaded parts so fitted as to allow threads to jump or parts to change adjustment shall be avoided.

§ 161.008-4 General requirements.

(a) Each flashlight shall be furnished complete with lamp and cells.

(b) Each flashlight shall be of the spotlight style providing a concentrated beam of light.

NOTE: When used in this specification, a concentrated beam of light is light projected in a nearly parallel beam, and is used to illuminate objects at considerable distances.

(c) All metal parts of each flashlight shall be made of corrosion-resistant material. All copper or copper alloy parts coming in contact with rubber shall be cadmium plated, or otherwise treated to prevent corrosion and disintegration of the rubber.

(d) Each flashlight shall be provided with means to prevent it from rolling freely when placed on a flat surface.

(e) Each flashlight shall be provided with one spare lamp which shall be contained within the case.

(f) The construction of each flashlight shall be such that a metallic contact outside the case cannot close the battery circuit.

(g) The proportions and design of each flashlight shall be such that the assembled unit, complete with lamp and cells, shall be capable of withstanding, without breakage or material distortion of any part, and without upsetting the lamp focus, the drop test specified in § 161.008-6(b)(1). The flashlight shall be in working order upon completion of the test.

NOTE: Damage of lamp filament or shifting of filament within the lamp as a result of this test shall not be cause for rejection of the flashlight.

(h) The concentrated beam of light of each flashlight when tested in accordance with § 161.008-6(b)(3) shall be well defined, relatively uniform in intensity, and shall have a minimum peak candlepower and maximum diameter as specified in Table 161.008-4(h).

TABLE 161.008-4(h)

Sizes	Candlepower (min.)	Beam diameter (maximum in inches)
Size No. 2	800	10
Size No. 3	1,200	10

(i) Each flashlight shall be watertight, i.e., shall show no appreciable leakage of water, and shall be in perfect working order when cells are assembled therein following the test prescribed in § 161.008-6(b)(2). The flashlight shall be capable of being disassembled and reassembled without undue difficulty upon completion of the test. The total water absorption and leakage into the flashlight during this test shall not exceed 5 percent by weight.

[CGFR 49-43, 15 FR 129, Jan. 11, 1950, as amended by CGFR 70-143, 35 FR 19966, Dec. 30, 1970]

§ 161.008-5 Detail requirements.

(a) *Dimensions.* The dimensions of the flashlights covered by this specification shall be in accordance with Table 161.008-5(a).

TABLE 161.008-5(a)

Sizes	Lens head ring size (dimensions across flats in inches, approx.)	Length (maximum in inches)
Size No. 2	2½	8
Size No. 3	2½	10½

(b) *Case and lens head ring.* (1) The flashlight case shall be suitable to receive standard tubular cells, $1\frac{5}{16}$ inches in diameter by 2⅜ inches long. Means shall be provided on the exterior surface of the flashlight case to effect a satisfactory grip. The number of cells per flashlight shall be as specified in § 161.008-2(b). Cells shall be held in the case under sufficient pressure to insure good contact and to prevent breaking the circuit when the flashlight is shaken by the hand. Cells shall be readily replaceable.

(2) The case, lens head ring and end cap, shall be made of one of the following (the case, ring and cap, need not be made of the same material but cooperating threaded surfaces should be of the same material, preferably corrosion-resistant metal):

(i) Molded plastic material specified in § 161.008-3 (a)(1).

(ii) Rigid, corrosion-resistant material.

(c) *Lens.* The lens shall be of good quality laminated shatter-proof glass, or other approved equivalent material, free from bubbles, striae, wrinkles or other defects and blemishes which would affect the light distribution. The lens shall be secured to the lens head ring by a suitable retaining ring or other device, so as to prevent it from being dropped when the lens head ring is unscrewed.

(d) *Cells.* Each cell shall be of a quality to meet the requirements of flashlight cell designation General Purpose, size D, in accordance with Federal Specification W-B-101, as determined by the National Bureau of Standards Qualification Tests.

(e) *Reflector.* The reflector shall be of sheet or die-cast metal, or other approved equivalent material, and shall be not less than 1¾ inches in diameter. It shall have sufficient rigidity so as not to become distorted when the flashlight is completely assembled with cells and lamp. It shall have a parabolic reflecting surface, highly polished, and resistant to corrosion and discoloration.

(f) *Lamps.* The lamp used in each flashlight shall be of the prefocused type, the ratings of which are indicated in Table 161.008-5 (f).

TABLE 161.008-5(f)

Sizes	Commercial trade number of lamp	Design (volts)	Current (ampere)
Size No. 2	PR-6	2.47	0.30
Size No. 3	PR-7	3.7	.30

(g) *Lamp holder.* The lamp holder shall be firmly attached to the reflector It shall be so positioned that the lamp, when assembled in the holder, shall have its filament located at the focus of the reflector, with the accuracy necessary to produce a concentrated beam of light as specified in § 161.008-6 (3). It shall have sufficient rigidity so as not to become distorted when the flashlight is completely assembled with cells and lamp. Means shall be provided to protect the lamp from damage by battery impact and for conveniently removing and replacing the lamp.

(1) The mounting adjustment shall have sufficient stability to retain the focal adjustment of the lamp under a condition of vibration, and when the flashlight is shaken by the hand.

(h) *Switch.* The switch shall be conveniently located and securely attached to the flashlight. It shall be provided with a permanent "on" position, a manually operable signaling or flashing position, and a locked "off" position. It shall be provided with means to prevent accidental closing of the lamp circuit. The switch parts and switch contact strip shall be adequately insulated so that it will be impossible for metal-clad cells to close a circuit when the switch is on the "off" position.

(1) Contact springs shall be of phosphor bronze, spring brass, or other approved corrosion-resistant equivalent material.

(2) Each switch shall be capable of 25,000 cycles of normal operation as specified in § 161.008-6(b)(4) without mechanical or electrical failure.

(i) *Suspension member.* Each flashlight shall be equipped with a suitable suspension ring or clip.

[CGFR 49-43, 15 FR 129, Jan. 11, 1950, as amended by CGFR 49-43, 15 FR 871, Feb. 17, 1950; CGFR 70-143, 35 FR 19966, Dec. 30, 1970]

§ 161.008-6 Inspection and methods of test.

(a) *Inspection.* The Coast Guard reserves the right to make any inspection it deems necessary to determine the conformance of the materials and equipment to this specification.

(1) The facilities, materials, and labor for all tests shall be furnished by the manufacturer, when available, and at no cost to the Coast Guard.

(2) When testing facilities are not available at the point of inspection, samples shall be forwarded, prepaid by the manufacturer, to the Commandant, United States Coast Guard, Washington, D. C., for completion of the tests.

(b) *Methods of test*—(1) *Drop test.* The assembled flashlight, complete with cells and lamp, shall be dropped 3 times, each at a height specified in this paragraph, onto a concrete or rigid metal surface. The flashlight shall be dropped so as to strike once in an approximately horizontal position, once in a vertical position upon the head, and once in a vertical position upon the base. One sample shall be tested at a temperature between 5° F. and 0° F. and shall be dropped from a height of 3 feet, and another sample at a temperature between 145° F. and 150° F. and shall be dropped from a height of 5 feet. In each of the drop tests the temperature of the flashlight shall be the same as the temperature at which the test is conducted.

(2) *Watertightness test.* The assembled flashlight, with lamp but without cells, shall be submerged in a 3 percent solution of sodium chloride (by weight) in distilled water at a temperature of 65° F. to 70° F., under a head of 1 foot, and for a period of 24 hours. The flashlight shall then be removed and the excess water wiped off. The total water absorption and leakage shall be calculated from the measured weights of the flashlight at the start and finish of the test.

(3) *Tests for light projection requirements*—(i) *Beam characteristics.* The concentrated beam of light of the flashlight shall be projected on a screen placed at a distance of 10 feet from the lens. The plane of the screen shall be normal to the axis of the flashlight. The concentrated beam of light shall be measured for diameter and its luminous intensity distribution shall be examined.

(ii) *Peak candlepower.* The peak candlepower of the flashlight shall be measured at 10 feet distance from the exterior surface of the lens. In making this test, the lamp voltage shall be as given in Table 161.008-5 (f). The peak candlepower measurements shall be obtained by a Macbeth Illuminometer or other suitable means.

(4) *Switch fatigue test.* The switch mechanism of the flashlight shall be operated in a normal manner through 25,000 operating cycles at a rate not to exceed 15 cycles per minute. During this test the mechanism shall operate without mechanical faults, or electrical contact or other failures.

§ 161.008-7 Marking.

(a) Each flashlight shall be marked in a plain and permanent manner with the manufacturer's name or with a trade mark of such known character that the source of manufacture may be readily determined.

§ 161.008-8 Procedure for approval.

(a) *General.* Hand electric flashlights are approved only by the Commandant. Correspondence relating to the subject matter of this specification shall be addressed to the Commandant (MMT-1), U.S. Coast Guard, Washington, D.C. 20591.

(b) *Manufacturer's plans and specifications.* In order to obtain approval of hand electric flashlights, detailed plans and specifications, including a complete bill of material, assembly drawings, and parts drawings descriptive of the arrangement and construction of the device shall be submitted to the Commandant (MMT-1). Each drawing shall have an identifying drawing number, date and identification of the device; and the general arrangement or assembly drawing shall include a list of all drawings applicable, together with drawing numbers and alteration numbers. The manufacturer will be advised whether or not the drawings and specifications appear satisfactory or what corrections appear necessary and then he may proceed with the construction of the preapproval sample in accordance therewith.

(c) *Preapproval sample.* The preapproval sample, together with two copies of the plans and specifications, corrected as may be required, shall be forwarded to the Commandant (MMT-1), U.S. Coast Guard, Washington, D.C. 20591.

[CGFR 70-143, 35 FR 19966, Dec. 30, 1970]

Subpart 161.010—Floating Electric Water Light

SOURCE: CGFR 69-72, 34 FR 17495, Oct. 29, 1969, unless otherwise noted.

§ 161.010-1 Applicable specifications.

(a) The following specifications, of the issue in effect on the date electric water lights are manufactured, form a part of this subpart:

(1) Federal specifications and standards:

L-P-390 Plastic Molding Material, Polyethylene.
L-P-393 Plastic Molding Material, Polycarbonate.
TT-E-489 Enamel, Alkyd, Gloss.
W-B-101 Battery, Dry.
Federal Test Method Standard No. 406, Plastics: Method of Testing, Federal Standard No. 595e—Colors.

(2) Military specifications:

MIL-B-18—Batteries, Dry.
MIL-P-79—Plastic Rods and Tubes, Thermosetting laminated.
MIL-P-394—Plastic Molding Material, Polypropylene.
MIL-R-900—Rubbersheets and cut, molded and extruded special shaped sections, synthetic, medium, soft, low temperature, gasket application.
MIL-I-16923—Insulating Compound, Electrical Embedding.

(b) Applicable copies of the specifications in paragraph (a) of this section, as well as the various specifications forming a part thereof, shall be kept on file by the manufacturer, together with the certificate of approval. They shall be kept for a period consisting of the duration of the approval and 6 months after termination of approval.

(1) Federal Specifications and Standards may be purchased from the General Services Administration, Specification Activity, Printed Material and Supply Division, Building 197, Naval Weapons Plant, Washington, D.C. 20407.

(2) Military Specifications may be obtained from the Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, Pa. 19120.

(Sec. 6(b)(1), 80 Stat. 937; 49 U.S.C. 1655 (b)(1); 49 CFR 1.4(a)(2))

[CGFR 69-72, 34 FR 17495, Oct. 29, 1969, as amended by CGD 72-48R, 37 FR 25835, Dec. 5, 1972]

§ 161.010-2 Type.

(a) The requirements of this specification pertain to water lights that are required by Coast Guard Regulations to be attached to life ring buoys, liferafts, lifefloats, or other buoyant apparatus.

(Sec. 6(b)(1), 80 Stat. 937; 49 U.S.C. 1655 (b)(1); 49 CFR 1.4(a)(2))

[CGD 72-48R, 37 FR 25835, Dec. 5, 1972]

§ 161.010-3 Materials.

(a) *Materials.* All materials shall be of suitable quality for the purpose intended, and shall conform to the requirements of this specification.

(1) All metal parts of the light, including the bracket, shall be made of corrosion resistant materials. When used in this specification, the terms corrosion resistant material or corrosion resistant metal shall mean material which, when subjected to the test described in § 161.010-5(b)(10) shows no evidence of corrosion or corrosive action, such evidence to be in excess of six spots per square foot of area or any

spot measuring larger than one-sixteenth inch in any direction.

(2) Plastics:

(i) All plastic materials shall be fully cured and essentially free from volatile plasticizers or fillers. Thermosetting plastics shall be used whenever practicable for parts under constant stress. Thermoplastic materials, whenever used, shall be of a formulation that has high resistance to cold flow, shrinkage, and warpage, or discoloration due to heat and sunlight.

(ii) Materials used for embedding and encapsulating shall not, either in their original application or as a result of aging, have any injurious effect on the insulating materials to which they are applied and shall not cause corrosion or deterioration of any adjacent part. Unless otherwise specified, compounds shall be in accordance with MIL-I-16923 or specifically approved by the Commandant. The conditions under which these materials are applied and used shall in all respects conform to the manufacturer's recommendations. Compounds selected shall not flow at temperatures below 85° Centigrade nor crack or become loose at temperatures down to minus 34° Centigrade.

(3) The choice of material used when none is specified or where a choice is permitted shall be such that maximum resistance to corrosion, shock, and temperature change will be insured. The use of dissimilar materials in combination shall, in general, be avoided, but when such contacts are necessary, means shall be taken to prevent such deleterious effects as galvanic corrosion, freezing or buckling of parts, and loosening or tightening of joints due to differences in coefficients of thermal expansion or shrinkage.

(Sec. 6(b)(1), 80 Stat. 937; 49 U.S.C. 1655 (b)(1); 49 CFR 1.4(a)(2))

[CGFR 69-72, 34 FR 17495, Oct. 29, 1969, as amended by CGD 72-48R, 37 FR 25835, Dec. 5, 1972]

§ 161.010-4 Construction and performance.

(a) *General.* The light shall be a self-contained unit suitable for use as a floating illuminated marker. It shall be capable of being stowed in an inverted position, in which position it shall be self extinguishing. When in water, it shall float in a vertically upright position and become illuminating automatically.

(b) *Construction.* The light shall consist essentially of a case, embedding and filler material, battery, switch, electric circuit, flashtube or lamp assembly and spare lamp, globe, lanyard attachment ring and a mounting bracket. The light shall be watertight and vapor proof, and shall comply with the requirements specified herein.

(c) *Size.* The size, weight and shape of the light shall be suitable for conveniently throwing overboard attached to a life-ring buoy by means of a lanyard.

(d) *Case.* The case shall be made of corrosion resistant metal or plastic as specified in this subpart. The case shall be constructed to receive the components necessary to produce the required light output and withstand the tests specified in § 161.010-5. Additional signaling devices may be incorporated within or outside the case: *Provided,* The use of such signaling devices does not interfere with the required light output. Openings in the case shall be provided with a seal which will withstand the water-tightness test. Threaded joints, when provided, shall be made with at least six threads of 16 threads per inch gauge. A hole in either the exterior or interior of the case shall not completely penetrate the case.

(e) *Globe.* The globe shall be made of a colorless, glass or plastic and shall be reasonably free from bubbles, striae, checks, scratches or other optical or mechanical defects. The globe design shall be such that light is emitted as specified in paragraphs (r)(3), (s)(3), or (t)(3) of this section as applicable. The globe thickness shall be sufficient to withstand the impact test specified in § 161.010-5(b)(5) without any damage.

(f) *Filler material.* A nonabsorbent unicellular polyfoam plastic or other material specifically approved by the Commandant shall fill all void space between the base of the globe and the space reserved for the battery.

(g) *Ballast.* Ballast, when required to insure the flotation stability of the light and a high righting moment, shall be firmly secured in the lower portion of the case. A spacer shall be installed to separate the battery from the ballast and to act as a shock absorber for the battery.

(h) *Finish of light.* External parts of the light other than the lens shall be international orange as described by color code 12197 of the Federal Standard Number 595, "Colors". When the pigment in the plastic is not the required international orange the exterior surface shall be properly cleaned and prepared, and coated with two coats of international orange enamel in accordance with Federal Specification TT-E-489. The finish shall be uniform and smooth, shall adhere firmly, and withstand reasonable impact without chipping or cracking.

(i) *Mounting bracket.* The mounting bracket shall be designed to hold the light in the inverted position and prevent free movement of the light when properly secured within the bracket. The bracket shall permit quick release of the light and shall not have a lens shield or light cover. The bracket shall be made of corrosion resistant metal and shall be arranged for mounting on a vertical surface. The type and color of finish is optional.

(j) *Ring for lanyard attachment.* The ring for the lanyard attachment shall be approximately 1 inch in diameter and made of corrosion resistant material. The ring and attachment shall be capable of withstanding the test specified in § 161.010-5(b)(9) without separating.

(k)-(m) [Reserved]

(n) *Battery.* The light shall derive its source of electrical power from a self contained battery with screw post terminals. The battery shall be of a type manufactured in accordance with Military Specification MIL-B-18 or Federal Specification W-B-101. The battery shall be installed in the case such that it will be stowed in a position as recommended by the battery manufacturer. Other type power sources and batteries not manufactured in accordance with the referenced specifications will be given special consideration.

(o) *Lead wires and battery connectors.* Battery connectors shall be suitable for batteryscrew post terminals. When two wires are provided for battery connections, the wires shall be arranged, color coded, or marked so as to prevent improper connections. Other arrangements will be given special consideration by the Commandant.

If improper connection of the battery leads can result in damage to the electronic circuit, then the configuration of the connections shall be such that improper connection to the battery is physically impossible.

(p) *Switch.* A suitable switch shall be provided and encapsulated with the electronic circuitry where applicable such that with the light in the upright position the contacts will be closed and with the light inverted the contacts will be open. If no electronic circuit is provided, a clip shall securely hold the switch and shall be so designed and so protected that jarring of light will not crack or destroy the switch. The switch shall be designed to satisfactorily make and break the electrical circuit within a temperature range of minus 34° to plus 85° Centigrade. The switch shall be so designed to prevent the accidental making of the contacts when the inverted light is jarred or shaken. The switch shall be capable of 1,000 cycles with the energized electrical circuit specified herein.

(q) *Stroboscopic flashing light.* A flashing light with a capacitor-discharge xenon flashtube shall meet the requirements of this paragraph.

(1) *Electronic flashing unit.* A suitable electronic solid state circuit shall be provided which will take power from a battery specified in paragraph (n) of this section and supply it to the flashtube in a manner as to emit intermittent flashes of light as specified in paragraph (q)(3) of this section. Electrolytic capacitors shall not be used. The power to the flashtube shall not exceed the rated power as specified by the flashtube manufacturer. The average service life of the electronic circuit shall not be less than 500 hours. All components of the flashing unit excluding the flashtube shall be embedded in an encapsulating compound as specified in this subpart.

(2) *Flashtube.* A suitable capacitor-discharge xenon flashtube shall be provided which is compatible with the

electronic flashing circuit and lens. The flashtube shall provide the light output as specified in paragraph (q)(3) of this section. The installation of the flashtube shall be as recommended by the flashtube manufacturer. The lower section of the flashtube shall be encapsulated with the electronic circuit or suitably supported in a tube socket. The average service life of the tube shall not be less than 500 hours when connected to the circuit provided in accordance with paragraph (q)(1) of this section.

(3) *Light output.* The light shall emit flashes of light at a frequency of not less than 50 nor more than 70 flashes per minute for a period of not less than 15 hours. The light output shall be not less than 0.2 candela-seconds per flash in all directions of the upper hemisphere with the globe in place.

(r) *Flashing incandescent light.* A flashing incandescent light shall meet the requirements of this paragraph.

(1) *Electronic flashing unit.* A suitable electronic solid state circuit shall be provided which will take power from a battery specified in paragraph (n) of this section and supply it to the flash lamp in a manner as to emit intermittent flashes of light as specified in paragraph (r)(3) of this section. The power to the flash lamp shall not exceed the rated power specified by the flash lamp manufacturer. The average service life of the electronic circuit shall not be less than 500 hours. All components of the flashing unit excluding the flash lamp shall be embedded in an encapsulating compound as specified in this subpart.

(2) *Flash lamp.* A flash lamp shall be provided which is compatible with the electronic flashing circuit and globe to provide the light output specified in paragraph (r)(3) of this section. The average service life of flash lamp shall be not less than 75 hours when connected to the circuit provided in accordance with paragraph (r)(1) of this section. A spare lamp shall be carried in the interior portion of the light.

(3) *Light output.* The light shall emit flashes at a frequency of not less than 50 or more than 70 flashes per minute for a period of not less than 15 hours. The effective intensity of the light shall not be less than 2.0 candelas in all directions of the upper hemisphere with the globe in place. For purposes of this section, effective intensity is determined by the following formula:

$$Ie—(G/0.2+t_2—t_1)$$

where

Ie=Effective intensity.

G=Integral of Idt evaluated between the limits of $t_1 + t_2$.

t_1=Time in seconds of the beginning of the flash.

t_2=Time in seconds of the end of the flash.

I =Instantaneous intensity during the flash.

(the limits, t_1 and t_2, are chosen so as to maximize Ie)

(s) *Steady burning incandescent light.* A steady burning incandescent light shall meet the requirements of this paragraph.

(1) *Electronic circuit.* A solid state electronic circuit may be provided. The power provided to the lamp shall not exceed 110 percent of the rated power as specified by the lamp manufacturer. The average service life of an electronic circuit shall not be less than 500 hours. All components of an electronic circuit, including the switch, shall be embedded in an encapsulating compound as specified in this subpart.

(2) *Lamp.* A lamp shall be provided which is compatible with the power source and globe to provide the light output specified in paragraph (s)(3) of this section. The average service life of the lamp shall not be less than 75 hours when connected to the circuit as provided. A spare lamp shall be carried in the interior portion of the light.

(3) *Light output.* Light output shall be continuously emitted for a period of not less than 15 hours. The light output shall be not less than 2 candelas in all directions of the upper hemisphere with the globe in place.

(t) *Socket.* The socket shall be as recommended by the manufacturer. It shall be of corrosion resistant material, of durable construction and have suitable electrical clearances. Means shall be provided for minimizing the possibility of the lamp or flashtube becoming loose due to vibration. Flashtubes not requiring sockets may be used provided the terminals are connected by soldering and embedded in an encapsulating compound.

(u) *Electrical connections.* All electrical connections, except those intended to be removable, shall be mechanically secured and soldered and shall not depend on solder alone for mechanical strength. Where electrical connections are in close proximity, each shall be electrically insulated.

(Sec. 6(b)(1), 80 Stat. 937; 49 U.S.C. 1655 (b)(1); 49 CFR 1.4(a)(2))

[CGFR 69-72, 34 FR 17495, Oct. 29, 1969; 34 FR 19030, Nov. 29, 1969, as amended by CGD 72-48R, 37 FR 25835, Dec. 5, 1972]

§ 161.010-5 Inspection and methods of test.

(a) *Inspection.* The U.S. Coast Guard reserves the right to make any inspection or test it deems necessary to determine the conformance of the materials and equipment to this specification.

(1) The facilities, materials and labor for all tests shall be furnished by the manufacturer at no cost to the U.S. Coast Guard. When testing facilities are not available at the point of inspection, testing may be completed by a mutually acceptable independent testing organization.

(b) *Methods of tests.* The following tests shall be conducted in the order listed below insofar as is reasonable and practicable.

(1) *Endurance test.* The electronic circuit shall be operated at rated voltage for 500 hours. The light, complete with battery, shall be alternately inverted and righted 1,000 times and examined for proper operation.

(2) *Drop test.* The light complete with battery, shall be dropped twice from a height of 90 feet into water. A life-ring buoy shall be attached to the light by means of a lanyard 6 feet in length during one of the drops. After each drop, the light shall be examined for leakage, cracks, or breakage. The light shall operate satisfactorily after each drop.

(3) *Float test.* The light, complete with battery, shall be allowed to float vertically for 15 hours in water. The center of the lamp or flashtube shall not be less than 2 inches above the surface of the water. The light shall be disassembled after the text and examined. The presence of water in the interior of the case shall be cause for rejection.

(4) *Watertightness test.* The light, complete with battery, shall be submerged horizontally in water at a head of 1 foot for a period of 24 hours. At the end of the period the light shall be disassembled and examined. The presence of water in the interior of the case shall be cause for rejection.

(5) *Ruggedness.* The light, complete with battery, shall be cooled to minus 18° C. It shall be dropped twice from a height of 3 feet onto a rigidly mounted steel plate or concrete; the distance of 3 feet shall be measured from the top of the lens to impact surface. When dropped, the light shall strike on the top center of the lens. The case shall be placed in its bracket, and the bracket mounted securely and positioned so the light is lying in a horizontal position. A steel ball 1¼ pounds in weight shall be allowed to fall three times through a distance of 48 inches; once onto the center portion of the case, once at each end onto a point approximately one-half inch from the end of the case. The case shall be examined for breakage, or cracking. Any damage or distortion that might impair the serviceability or watertightness of the light will be cause for rejection. Failure of lamp filament shall not constitute failure of light.

(6) *Dimensional stability and vaporproof test.* The light assembled with battery shall be placed in a temperature-humidity chamber. The unit shall then be subjected to a 9-day continuous temperature-humidity cycle shown in Table 161.010-5(b)(6) without opening the light during the cycle. At the end of the tests the light shall be examined. And damage, shrinkage or distortion that might impair its serviceability, watertightness or vapor proofness will be cause for rejection. The light shall be considered vaporproof when examination of the interior reveals no moisture and no fog or cloudiness of the lens. The watertightness test specified in paragraph (b)(4) of this section shall then be repeated.

TABLE 161.010–5(b)(6)

Time period (hours)	Temperature degrees F(2°F)	Relative humidity percent
24	85	85–90
24	−34	Uncontrolled
24	85	0–5
24	85	85–90
24	−34	Uncontrolled
48	85	0–5
48	21	45–55

(7) *Weathering tests (plastic globe only)*. The globe shall be exposed to five complete cycles of Test Method 6023 and a 240-hour exposure cycle of Test Method 6024 as specified in the Federal Test Method Standard No. 406. The globe shall not have crazed or appreciably discolored.

(8) *Light output test*. The light output test shall be conducted after the tests specified in § 161.010–5(b)(7). The intensity and flash rate shall be measured at the end of the required operating period. The light shall meet the intensity requirements specified in § 161.010–4 (q) (3), (r)(3), or (s)(3) as applicable.

(9) *Pull test*. The light shall be adequately supported and a force of 50 pounds shall be applied to the lanyard attachment ring. Separation of the ring, loss of watertightness, or any other damage to the light will be cause for rejection.

(10) *Accelerated weathering (metallic parts)*. Under ultraviolet light alternate 3 minute cycles of (i) 20 percent salt spray at 55° C. and (ii) air blast at 55° C. without interruption for a period of 200 hours. Metallic parts shall be free of paint or other finish during this test.

(Sec. 6(b)(1), 80 Stat. 937; 49 U.S.C. 1655 (b)(1); 49 CFR 1.4(a)(2))

[CGFR 69–72, 34 FR 17495, Oct. 29, 1969, as amended by CGD 72–48R, 37 FR 25836, Dec. 5, 1972]

§ 161.010–6 Marking.

(a) *Instructions and nameplate*. Each light shall be provided on the outside with a brass or plastic plate containing instructions for the maintenance and care of the light. The instructions shall be clearly marked in a plain, easily readable, permanent manner. The nameplate data shall contain the name of the manufacturer, the Coast Guard approval number, and the drawing number and alteration identification of the light. In securing the instructions and/or nameplate to the case, the wall of the case shall not be penetrated. The instruction wording shall be compatible to the particular design and shall be acceptable to the Commandant.

(Sec. 6(b)(1), 80 Stat. 937; 49 U.S.C. 1655 (b)(1); 49 CFR 1.4(a)(2))

§ 161.010–7 Procedure for approval.

(a) Automatic floating electric waterlights are approved only by the Commandant, U.S. Coast Guard, Washington, D.C. 20591.

(b) Manufacturer's plans and specifications: In order to obtain approval of automatic floating waterlights, detailed plans and specifications, including a complete bill of material, assembly drawings, and parts drawings descriptive of the arrangement and construction of the device shall be submitted. Each drawing shall have an identifying drawing number, date, and identification of the device; and the general arrangement or assembly drawing shall include a list of all drawings applicable, together with the drawing numbers and alteration numbers. The manufacturer will be advised whether or not the drawings and specifications appear satisfactory or what corrections appear necessary and then he may proceed with the construction of the preapproval sample in accordance therewith.

(c) Preapproval sample. A preapproval sample together with two copies of the plans, specifications and certified test records shall be submitted to the Commandant, U.S. Coast Guard, 1300 E Street NW., Washington, D.C. 20591.

(Sec. 6(b)(1), 80 Stat. 937; 49 U.S.C. 1655 (b)(1); 49 CFR 1.4(a)(2))

Subpart 161.011—Emergency Position Indicating Radiobeacons

SOURCE: 39 FR 10139, Mar. 18, 1974, except as otherwise noted.

§ 161.011-1 Purpose.

This subpart prescribes approval requirements for emergency position indicating radiobeacons (EPIRB).

§ 161.011-5 Classes.

EPIRB's are classed as follows:

(a) Class A—an EPIRB that has been type approved or type accepted by the FCC as a Class A EPIRB. These EPIRB's are capable of floating free of a vessel and activating automatically if the vessel sinks.

§ 161.011-10 EPIRB approval.

(a) An EPIRB that has been type approved or type accepted by the FCC as a Class A EPIRB is hereby approved by the Coast Guard to meet the requirements of §§ 33.60-1, 75.60-1, 94.60-1, 167.35-72, 180.40-1 and 192.65-5 of this chapter.

(b) An application for type approval or type acceptance as a Class A EPIRB should be submitted to the Federal Communications Commission in accordance with 47 CFR Part 2.

(c) Manufacturers receiving type acceptance or type approval for a Class A EPIRB may request listing in USCG Publication CG-190, Equipment Lists, by addressing a request to COMDT (G-MMT-3/83), 400 Seventh Street, SW., Washington, D.C. 20593.

Subpart 161.012—Personal Flotation Device Lights

Authority: 46 U.S.C. 375, 390b, 391a, 416, 481, 526p, 1454, and 1488; 49 U.S.C. 1655(b); 50 U.S.C. 198; and 49 CFR 1.46.

Source: CGD 76-028, 44 FR 38785, July 2, 1979, unless otherwise noted.

§ 161.012-1 Scope.

(a) This subpart prescribes construction and performance requirements, approval and production tests, and procedures for approving personal flotation device lights fitted on Coast Guard approved life preservers, bouyant vests, and other personal flotation devices.

§ 161.012-3 Definitions.

(a) As used in this subpart, "PFD" means Coast Guard approved personal flotation device.

(b) For the purpose of § 161.012-7, "storage life" means the amount of time after the date of manufacture of the power source of a light that the power source can be stored under typical marine environmental conditions on a vessel and still have sufficient power for the light to meet the requirements of § 161.012-9.

§ 161.012-5 Approval procedures.

(a) An application for approval of a PFD light under this subpart must be sent to the Commandant (G-MMT-3/83), U.S. Coast Guard, Washington, D.C. 20590.

(b) Each application for approval must contain—(1) The name and address of the applicant;

(2) Two copies of plans showing the construction details of the light;

(3) A detailed description of the applicant's production testing program; and

(4) A laboratory test report containing the observations and results of approval testing.

(c) The Commandant advises the applicant whether the light is approved. If the light is approved, an approval certificate is sent to the applicant.

§ 161.012-7 Construction.

(a) Each light must be designed to be attached to a PFD without damaging the PFD or interfering with its performance.

(b) Each light and its power source must be designed to be removed and replaced without causing damage to the PFD.

(c) The storage life of the power source of a light must be twice as long as the period between the date of manufacture and the expiration date of the power source.

(d) Each light, prior to activation, must be capable of preventing leakage from its container of any chemicals it contains or produces.

(e) Each component of a light must be designed to remain serviceable in a marine environment for at least as long as the storage life of the light's power source.

(f) No light may have a water pressure switch.

(g) Each light must be designed so that when attached to a PFD, its light beam, at a minimum, is visible in an arc of 180 degrees above or in front of the wearer.

(h) Each light, including its power source, must fit into a cylindrical space that is 150 mm (6 in.) long and 75 mm (3 in.) in diameter.

(i) Each light, including its power source, must not weigh more than 225g (8 oz.).

(j) Each light that is designed to operate while detached from a PFD must have a lanyard that can be used to connect it to the PFD. The lanyard must be at least 750 mm (30 in.) long.

(k) Each light designed to operate while detached from a PFD must be capable of floating in water with its light source at or above the surface of the water.

§ 161.012-9 Performance.

(a) If a light is a flashing light, its flash rate when first activated, or within five minutes thereafter, must be between 50 and 70 flashes per minute.

(b) Each light must—(1) Begin to shine within 2 minutes after activation; and

(2) Within 5 minutes after activation be capable of being seen from a distance of at least one nautical mile on a dark clear night.

(c) Each light must be designed to operate underwater continuously for at least 8 hours at a water temperature of 15°±5°C (59°±9°F). However, if the light needs air to operate, underwater operation is required only for 50 or more seconds during each minute of the eight hour period.

(d) Each light must be designed to operate both in sea water and in fresh water.

(e) A light that concentrates its light beam by means of a lens or curved reflector must not be a flashing light.

(f) Each light must be designed to operate in accordance with this section after storage for 24 hours at a temperature of 65°±2°C (149°±44°F), and after storage for 24 hours at −30°±2°C (−22°±4°F).

§ 161.012-11 Approval tests.

(a) The approval tests described in this section must be conducted for each light submitted for Coast Guard approval. The tests must be conducted by a laboratory that has the equipment, personnel, and procedures necessary to conduct the approval tests required by this subpart, and that is free of influence and control of the applicant and other manufacturers, suppliers, and vendors of PFD lights.

(b) A sample light must be activated at night under clear atmospheric conditions. However, two lights must be used if the power source is water activated, and one light must be activated in fresh water and the other in salt water having the approximate salinity of sea water. The light, or lights, must begin to shine within 2 minutes after activation and, within 5 minutes after activation, must be seen from a distance of at least one nautical mile against a dark background.

(c) At least ten sample lights must be selected at random from a group of at least 25. Each sample light must be kept at a constant temperature of 65°±2°C (149°±4°F) for 24 hours. Each sample light must then be kept at a constant temperature of minus 30°±2°C (minus 22°±4°F) for 24 hours. Five samples must then be submerged in salt water having the approximate salinity of sea water and the five other samples must be submerged in fresh water. The temperature of the water must be 15°±5°C (59°±9°F). The lights must then be activated and left submerged for eight hours. However, if their power sources need a supply of air to operate, the lights may be brought to their normal operating positions at the surface of the water for up to 10 seconds per minute during the eight hour period. At least nine of the ten lights must operate continuously over the eight hour period. If the lights are flashing lights, at least nine of ten must have a flash rate of between 50 and 70 flashes per minute when first activated or within five minutes thereafter.

(d) Individual tests must be conducted on a sample light to determine whether the light meets the requirements of § 161.012-7, except that technical data showing compliance with § 160.012-7(c) may be submitted with the application for approval in lieu of performing an individual test.

§ 161.012-13 Production tests and inspections.

(a) The manufacturer of approved lights must randomly select a sample of ten lights from each lot of lights produced. Each lot must not exceed 1,000 lights. At least nine of the ten lights, when tested in accordance with the test described in § 161.012-11(c), must meet the test criteria prescribed by that section. If less than nine lights meet the test criteria, another random sample of ten lights must be taken and tested. If less than nine of these lights meet the test criteria, none of the lights in the lot may be sold as Coast Guard approved equipment.

(b) The Coast Guard does not inspect lights approved under this subpart on a regular schedule. However, the Commandant may select samples and conduct tests and examinations whenever necessary to determine whether the lights are being manufactured in compliance with the requirements in this subpart.

§ 161.012-15 Markings.

(a) Each light manufactured under Coast Guard approval must be permanently and legibly marked with:

(1) The manufacturer's name or trade mark that clearly identifies the model designation;

(2) The Coast Guard approval number asssigned to light; and

(3) Instructions on how to activate the light.

(b) The power source of each light must be permanently and legibly marked with its date of manufacture and expiration date. Each date must include the month and year.

§ 161.012-17 Instructions.

(a) Each light must have instructions on how to attach it to a PFD in a manner that complies with § 161.012-7(a). However, in the case of lights that are to be attached by a PFD manufacturer, only one set of instructions need be provided for each shipment of lights.

(b) If a light is designed to be attached to a finished PFD, any attachment materials that are not supplied with the light must be clearly identified in the instructions. If a light is to be attached to a finished PFD by a PFD purchaser, any attachment materials not supplied with the light must be generally available for purchase.

(c) Each set of instructions must—

(1) Clearly identify the kind of PFD construction (for example fabric covered or vinyl dipped) to which the light can be attached; and

(2) Not require penetration of the bouyant material of the PFD.

Subpart 161.013—Electric Distress Light for Boats

AUTHORITY: Section 5, 85 Stat. 215 as amended, 46 U.S.C. 1454; 49 CFR 1.46(n)(1).

SOURCE: CGD 76-183a, 44 FR 73054, Dec. 17, 1979, unless otherwise noted.

§ 161.013-1 Applicability.

(a) This subpart establishes standards for electric distress lights for boats.

§ 161.013-3 General performance requirements.

(a) Each electric light must:

(1) Emit a white light which meets the intensity requirements of § 161.013-5;

(2) Be capable of automatic signaling in a manner which meets the requirements of § 161.013-7;

(3) Contain an independent power source which meets the requirements of § 161.013-9;

(4) Float in fresh water with the lens surface at or above the surface of the water;

(5) Be equipped with a waterproof switch; and

(6) Meet the requirement of subparagraphs (a) (1) through (4) of this section after floating for at least 72 hours followed by submersion in 5% by weight sodium chloride solution for at least 2 hours.

(b) The electric light may not be equipped with a switch mechanism which permits continuous display of a beam of light except that the light may be equipped with a switch which returns to the off position when pressure is released.

§ 161.013-5 Intensity requirements.

(a) If an electric light emits light over an arc of the horizon of 360 degrees, the light must:

(1) When level, have a peak intensity within 0.1 degrees of the horizontal plane;

(2) Have a peak Equivalent Fixed Intensity of at least 75 cd; and,

(3) Have a minimum Equivalent Fixed Intensity within a vertical divergence of ±3 degrees of at least 15 cd.

(b) If an electric light emits a directional beam of light, the light must:

(1) Have an Equivalent Fixed Intensity of no less than 25 cd within ±4 degrees vertical and ±4 degrees horizontal divergence centered about the peak intensity; and,

(2) Have a minimum peak Equivalent Fixed Intensity of 2,500 cd.

(c) The Equivalent Fixed Intensity (EFI) is the intensity of the light corrected for the length of the flash and is determined by the formula:

$$EFI = I \times (t_c - t_i)/0.2 + (t_c - t_i)$$

Where:

I is the measured intensity of the fixed beam,

t_c is the contact closure time in seconds, (0.33 for this S-O-S signal), and

t_i is the incandescence time of the lamp in seconds.

(d) An electric light which meets the requirements of either paragraph (a) or (b) of this section need not, if capable of operating in both manners, meet the requirements of the other paragraph.

§ 161.013-7 Signal requirements.

(a) An electric light must have a flash characteristic of the International Morse Code for S-O-S and, under design conditions,

(1) Each short flash must have a duration of ⅓ second;

(2) Each long flash must have a duration of 1 second;

(3) The dark period between each short flash must have a duration of ⅓ second;

(4) The dark period between each long flash must have a duration of ⅓ second;

(5) The dark period between each letter must have a duration of 2 seconds;

(6) The dark period between each S-O-S signal must have a duration of 3 seconds.

(b) The flash characteristics described in paragraph (a) must be produced automatically when the signal is activated.

§ 161.013-9 Independent power source.

(a) Each independent power source must be capable of powering the light so that it meets the requirements of § 161.013-3(a)(1) and emits a recognizable flash characteristic of the International Morse Code for S-O-S at a rate of between 3 and 5 times per minute after six hours of continuous display of the signal.

(b) If the independent power source is rechargeable, it must have a waterproof recharger designed for marine use.

(c) If the independent power source requires external water to form an electrolyte, it must operate in sea water and fresh water.

§ 161.013-11 Prototype test

(a) Each manufacturer must test a prototype light identical to the lights to be certified prior to the labeling required by § 161.013-13.

(b) If the prototype light fails to meet any of the general performance requirements of § 161.013-3 the lights must not be certified under this subpart.

(c) Each manufacturer must:

(1) Forward the test results within 30 days to the Commandant (G-BBT/TP42), U. S. Coast Guard, Washington, D.C. 20591; and

(2) Retain records of the test results for at least 5 years, or as long as the light is manufactured and certified, whichever is longer.

§ 161.013-13 Manufacturer certification and labeling.

(a) Each electric light intended as a Night Visual Distress Signal required by 33 CFR part 175 must be certified by the manufacturer as complying with the requirements of this subpart.

(b) Each electric light must be legibly and indelibly marked with:

(1) Manufacturer's name;

(2) Replacement battery type;

(3) Lamp size; and

(4) The following words—

"Night Visual Distress Signal for Boats Complies with U. S. Coast Guard Requirements in 46 CFR 161.013. For Emergency Use Only."

(c) If an electric light is designed for use with dry cell batteries the label must advise the consumer on the battery replacement schedule which under normal conditions would maintain performance requirements of § 161.013-3.

§ 161.013-17 Manufacturer notification.

(a) Each manufacturer certifying lights in accordance with the specifications of this subpart must send written notice to the Commandant (G-BBT/TP42), U. S. Coast Guard, Washington, D.C. 20591 within 30 days after first certifying them, and send a new notice every five years thereafter as long as it certifies lights.

PART 162—ENGINEERING EQUIPMENT

Subpart 162.001—Safety Valves (Propulsion Boilers for Steam Service in Excess of 30 Pounds Per Square Inch Gage)

Sec.

162.001-1 Applicable specifications, and referenced material.
162.001-2 Scope.
162.001-3 Materials.
162.001-4 Construction, adjustment and testing.
162.001-5 Marking.
162.001-6 Procedure for approval.

Subpart 162.002—Safety Valves (Auxiliary Boilers for Steam Service in Excess of 30 Pounds Per Square Inch Gage)

162.002-1 Applicable specifications and referenced material.
162.002-2 Scope.
162.002-3 Materials.
162.002-4 Construction, adjustment, and testing.
162.002-5 Marking.
162.002-6 Procedure for approval.

Subpart 162.012—Safety Valves (Steam Service Not in Excess of 30 Pounds Per Square Inch Gage)

Sec.

162.012-1 Applicable specifications, and referenced material.
162.012-2 Scope.
162.012-3 Materials.
162.012-4 Construction and workmanship.
162.012-5 Marking.
162.012-6 Flow rating tests.
162.012-7 Procedure for approval.

Subpart 162.013—Relief Valves (Hot Water Heating and Hot Water Supply Boilers)

162.013-1 Applicable specifications, and referenced material.
162.013-2 Scope.
162.013-3 Materials.
162.013-4 Construction and workmanship.
162.013-5 Marking.
162.013-6 Flow rating tests.
162.013-7 Procedure for approval.

Subpart 162.014—Fusible Plugs for Merchant Vessels

162.014-1 Applicable specifications, and referenced material.
162.014-2 General requirements.
162.014-3 Types.
162.014-4 Materials.
162.014-5 Construction and workmanship.
162.014-6 Inspections and tests.
162.014-7 Marking.
162.014-8 Procedure of acceptance of fusible plugs.

Subpart 162.016—Flame Arresters for Tank Vessels

162.016-1 Applicable specifications.
162.016-2 Type.
162.016-3 Materials, construction, and workmanship.
162.016-4 Inspection and testing.
162.016-5 Marking.
162.016-6 Procedure for approval.

Subpart 162.017—Valves, Pressure-Vacuum Relief and Spill, for Tank Vessels

162.017-1 Applicable specifications.
162.017-2 Type.
162.017-3 Materials, construction, and workmanship.
162.017-4 Inspections and testing.
162.017-5 Marking.
162.017-6 Procedure for approval.

Subpart 162.018—Safety Relief Valves, Liquefied Compressed Gas

Sec.
162.018-1 Applicable specifications, and referenced material.
162.018-2 Scope.
162.018-3 Materials.
162.018-4 Construction and workmanship.
162.018-5 Blow-down adjustment and popping tolerance.
162.018-6 Marking.
162.018-7 Flow rating tests.
162.018-8 Procedure for approval.

Subpart 162.027—Combination Solid Stream and Water Spray Firehose Nozzle and Low-Velocity Water Spray Applicator

162.027-1 Applicable specifications.
162.027-2 Type and size.
162.027-3 Materials, construction, workmanship, and performance requirements.
162.027-4 Inspections and tests.
162.027-5 Marking.
162.027-6 Procedure for approval.

Subpart 162.028—Extinguishers, Fire, Portable, Marine Type

162.028-1 Applicable specifications.
162.028-2 Classification.
162.028-3 Requirements.
162.028-4 Marine type label.
162.028-5 Recognized laboratory.
162.028-6 Examinations, tests, and inspections.
162.028-7 Procedure for listing and labeling.
162.028-8 Termination of listing or labeling.

Subpart 162.034—International Shore Connections (Ship)

162.034-1 Applicable specifications.
162.034-2 Type.
162.034-3 Materials, workmanship, and construction.
162.034-4 Inspection and tests.
162.034-5 Marking.
162.034-6 Procedure for approval.

Subpart 162.039—Extinguishers, Fire, Semiportable, Marine Type

162.039-1 Applicable specifications.
162.039-2 Classification.
162.039-3 Requirements.
162.039-4 Marine type label.
162.039-5 Recognized laboratory.
162.039-6 Examinations, tests, and inspections.
162.039-7 Procedure for listing and labeling.
Sec.
162.039-8 Termination of listing or labeling.

Subpart 162.041—Backfire, Flame Control, Gasoline Engines; Flame Arresters; for Merchant Vessels and Motorboats

162.041-1 Applicable specifications.
162.041-2 Scope.
162.041-3 Flame arresters.
162.041-4 Materials, construction and workmanship.
162.041-5 Inspection and tests.
162.041-6 Marking.
162.041-7 Procedure for approval.

Subpart 162.042—Backfire Flame Control, Gasoline Engines; Engine Air and Fuel Induction Systems; for Merchant Vessels and Motorboats

162.042-1 Applicable specifications.
162.042-2 Scope.
162.042-3 Engine air and fuel induction systems providing backfire flame control.
162.042-5 Inspection and tests.
162.042-6 Marking.
162.042-7 Procedure for approval.

Subpart 162.043—Backfire Flame Control, Gasoline Engines; Engine Air Induction System; for Merchant Vessels and Motorboats

162.043-1 Applicable specifications.
162.043-2 Scope.
162.043-3 Engine air induction systems providing backfire flame control.
162.043-4 Materials, construction, and workmanship.
162.043-5 Inspection and tests.
162.043-6 Marking.
162.043-7 Procedure for approval.

Subpart 162.050—Pollution Prevention Equipment

162.050-1 Scope.
162.050-3 Definitions.
162.050-4 Documents incorporated by reference.
162.050-5 Contents of application.
162.050-7 Approval procedures.
162.050-9 Test report.
162.050-11 Marking.
162.050-13 Factory production and inspection.
162.050-14 Sample collection and preservation.
162.050-15 Designation of facilities.
162.050-17 Separator test rig.
162.050-19 Monitor and bilge alarm test rig.
162.050-21 Separator: Design specification.
162.050-23 Separator: Approval tests.

Sec.
162.050-25 Cargo monitor: Design specification.
162.050-27 Cargo monitor: Approval tests.
162.050-29 Bilge monitor: Design specification.
162.050-31 Bilge monitor: Approval tests.
162.050-33 Bilge alarm: Design specification.
162.050-35 Bilge alarm: Approval tests.
162.050-37 Vibration test.
162.050-39 Measurement of oil content.

Subpart 162.001—Safety Valves (Propulsion Boilers for Steam Service in Excess of 30 Pounds Per Square Inch Gage)

AUTHORITY: R.S. 4417a, as amended, 4418, as amended, 4426, as amended, 4433, as amended, 4488, as amended, 4491, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, sec. 3, 54 Stat. 347, as amended, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 392, 404, 411, 481, 489, 367, 1333, 50 U.S.C. 198; E.O. 11239, July 31, 1965, 30 FR 9671, 3 CFR, 1965 Supp.

SOURCE: CGFR 68-82, 33 FR 18904, Dec. 18, 1968, unless otherwise noted.

§ 162.001-1 Applicable specifications, and referenced material.

(a) There are no other specifications applicable to this subpart except as noted in this subpart.

(b) The following referenced material from industry standards of the issue in effect on the date safety valves are manufactured shall form a part of the regulations of this subpart (see §§ 2.75-17 through 2.75-19 of Subchapter A (Procedures Applicable to the Public) and Subpart 50.15 of Subchapter F (Marine Engineering) of this chapter):

(1) ASME (American Society of Mechanical Engineers) Code (see § 50.15-5 of Subchapter F (Marine Engineering) of this chapter): The following paragraphs from section I of the ASME Code:

(i) PG-67 through PG-72, design, construction, adjustments, and tests, see § 162.001-4(a).

(ii) PG-71, drains, see § 162.001-4(f).

(iii) PG-110, markings, see § 162.001-5(a).

(iv) PG-69, tests, see § 162.001-6(c).

(c) A copy of this specification and the referenced material listed in this section shall be kept on file by the manufacturer, together with the approved plans, specifications and certificate of approval. It is the manufacturer's responsibility to have the latest issue, including addenda and changes, of the referenced material on hand when manufacturing equipment under this subpart.

(1) The ASME Code may be obtained from the American Society of Mechanical Engineers, United Engineering Center, 345 East 47th Street, New York, N.Y. 10017.

(Sec. 552, 80 Stat. 383, as amended; 5 U.S.C. 552)

§ 162.001-2 Scope.

(a) This specification concerns the requirements for the design, construction, and testing of spring loaded safety valves intended for use on propulsion boilers and Class 1 nuclear vessels designed for pressures in excess of 30 pounds per square inch that are installed on merchant vessels subject to inspection by the Coast Guard. Other types of valves may be utilized where permitted by the applicable parts of Subchapter F of this chapter and shall meet the requirements of this subpart as appropriate.

[CGFR 68-82, 33 FR 18904, Dec. 18, 1968, as amended by CGFR 72-59R, 37 FR 6190 Mar. 25, 1972; 38 FR 17230, June 29, 1973]

§ 162.001-3 Materials.

(a) The materials used in the manufacture of safety valves shall conform to the applicable requirements of Subchapter F (Marine Engineering) of this chapter except as otherwise specified in this subpart.

(b) Safety valve bodies may be made of carbon or alloy forged or cast steel or cast bronze or of such other equivalent material as may be approved by the Commandant.

(c) Internal parts shall be made of materials possessing corrosion and heat resisting qualities suitable for the service conditions to which they will be subjected.

(d) Springs used in safety valves shall be of the best quality spring steel consistent with the design of the valve and the service requirement. Heat-resistant alloy-steel springs shall be used on valves intended for superheated steam service above 650° F.

(e) Bonnet or yoke material of spring loaded safety valves when subject to temperatures exceeding 900° F. shall be made of material having low thermal expansion properties, or a cooling spool shall be provided to reduce the temperature between the valve body and the bonnet assembly.

(f) Cast iron is prohibited in the construction of any part of the safety valve except in caps or lifting bars. When used for these parts the elongation shall be at least 5 percent in a 2-inch gauge length.

(g) Nonmetallic material is prohibited in the construction of safety valve pressure parts except for gaskets and packing.

§ 162.001-4 Construction, adjustment and testing.

(a) Safety valves shall be designed, constructed, adjusted and tested in accordance with PG-67 through PG-72 of the ASME Code section 1 except as indicated in this subpart and § 52.01-120 of Subchapter F (Marine Engineering) of this chapter.

(b) Safety valve inlet diameters shall be not less than 1½ inches nor more than 4 inches. Safety valves shall have bolted flanged inlets. Welding end inlets may be authorized by the Commandant.

(c) Springs shall be so constructed that the disc can lift from its seat to a height not less than 25 percent greater than the rated capacity lift of the valve before the coils are closed or before there is other interference. Whenever lift stops are used by the manufacturer for the purpose of preventing overlift they shall permit the full rated capacity lift plus a minimum tolerance of one sixty-fourth inch.

(d) Springs of safety valves shall be of the exposed spring type when the temperature of the steam exceeds 450° F. Exposed springs shall be enclosed in a ventilated metal housing preferably of the louver type or perforated with holes not exceeding three-sixteenths inch in diameter and sealed to prevent tampering.

(e) If the operating conditions of a valve are changed so as to require a new spring for a different pressure, the valve shall be adjusted by the manufacturer or his authorized representative who shall furnish and install a new nameplate as required under § 162.001-5.

(f) Safety valves from 1½ inch through 2 inch size shall be tapped for not less than ¼-inch size drain located below the level of the seat. Safety valves larger than 2 inch size shall be tapped in accordance with PG-71 of the ASME Code.

(g)(1) All safety valves for use on boilers, superheaters, class A nuclear vessels, and steam generators in the secondary side of nuclear power systems shall be supplied with gags or clamps for holding the disc on its seat when blowdown adjustments and hydrostatic tests are being made. Gagging a safety valve by means of a set screw through the cap or by screwing down the compression or adjusting screw to hold the valve on its seat is prohibited.

(2) Safety valves for use on unfired steam generators except for the secondary side of nuclear power systems, are not required to be fitted with gags or clamps.

(h) Safety valves shall be constructed so that shocks detrimental to the valve or boiler are not produced when lifting or closing.

(i) After the valve is set and adjusted, the tolerance in popping and reseating pressures shall not vary more than plus or minus 1 percent for saturated steam and 1½ percent for superheated steam service.

(j) The design of the huddling device shall be such that its adjustment will remain symmetrical with the axis of the valve and shall include a suitable stop for fixing such device after adjustment is made.

§ 162.001-5 Marking.

(a) Each safety valve shall be marked by the manufacturer in accordance with PG-110 of the ASME Code except that the ASME symbol may be omitted.

(b) The official Coast Guard approval number shall be marked on each valve in addition to the data required in § 162.001-5(a). The minimum wording for showing the approval number shall be "USCG 162.001/* *" or "USCG 162.001-* *".

§ 162.001-6 Procedure for approval.

(a) *General.* Safety valves intended for use as defined shall be approved by the Commandant (MMT), U.S. Coast Guard, Washington, D.C. 20591.

(b) *Plan submission.* Manufacturers desiring to secure approval of a new design or type of safety valve shall submit clear design drawings in triplicate with the material specifications of the component parts. In the event the design is changed, amended drawings shall be submitted to the Commandant for reapproval.

(c) *Preapproval tests.* Before approval is granted, manufacturers shall have flow tests conducted in accordance with PG-69 of the ASME Code. The manufacturer shall submit evidence that such tests have been conducted, in the form of certification of ASME Capacities by the National Board of Boiler & Pressure Vessel Inspectors, or by submitting a copy of flow test report ASME Form P-1, and a table of relieving capacities for each size of valve for which approval is required. Such data shall be forwarded to the Commandant with plan submission.

Subpart 162.002—Safety Valves (Auxiliary Boilers for Steam Service in Excess of 30 Pounds Per Square Inch Gage)

AUTHORITY: R.S. 4405, as amended, 4462, as amended, sec. 1, 63 Stat. 496, 545, sec. 6(b)(1), 80 Stat. 937; 46 U.S.C. 375, 416, 14 U.S.C. 2, 633, 49 U.S.C. 1655(b) (1); 49 CFR 1.46.

SOURCE: CGFR 72-59R, 37 FR 6190, Mar. 25, 1972, unless otherwise noted.

§ 162.002-1 Applicable specifications and referenced material.

(a) There are no other specifications applicable to this subpart except as noted in this subpart.

(b) The following referenced material from industry standards of the issue in effect on the date a safety valve is manufactured shall form a part of the regulations of this subpart (see §§ 2.75-17 through 2.75-19 and Subpart 50.15 of Part 50 of this chapter):

(1) ASME (American Society of Mechanical Engineers) Boiler and Pressure Vessel Code (see § 50.15-5 of this chapter): The following paragraphs from section I of the ASME Code:

(i) PG-67 through PG-72, design, construction, and adjustments, see § 162.002-5.

(ii) PG-110, markings, see § 162-002-5(a).

(iii) PG-69, tests, see § 162.002-6(c).

(c) A copy of this specification and the referenced material listed in this section shall be kept on file by the manufacturer, together with the approved plans, specifications, and certificate of approval. It is the manufacturer's responsibility to have the latest issue, including addenda and changes of the referenced material on hand when manufacturing equipment prescribed by this subpart.

(1) The ASME Code may be obtained from the American Society of Mechanical Engineers, United Engineering Center, 345 East 47th Street, New York, NY 10017.

§ 162.002-2 Scope.

This specification prescribes requirements for the design, construction, and testing of spring loaded safety valves intended for use on unfired steam generators and auxiliary boilers designed for pressures in excess of 30 pounds per square inch gage and installed on merchant vessels subject to inspection by the U.S. Coast Guard.

§ 162.002-3 Materials.

(a) The materials used in the manufacture of safety valves must conform to the applicable requirements of Subchapter F of this chapter except as otherwise specified in this subpart.

(b) Safety valve bodies must be made of carbon or alloy forged or cast steel, cast bronze, or of such other equivalent material as may be approved by the Commandant.

(c) Internal parts must be made of materials possessing corrosion and heat resisting qualities suitable for the service conditions to which they will be subjected.

---

* *Number to be assigned by the Commandant.

(d) Springs used in safety valves must be of the best quality spring steel consistent with the design of the valve and the service requirement.

(e) Cast iron must not be used in the construction of any part of the safety valve except in caps or lifting bars. When used for these parts, the elongation shall be at least 5 percent in a 2-inch gage length.

(f) Nonmetallic material is prohibited in the construction of safety valve pressure parts except for gaskets and packing.

§ 162.002-4 Construction, adjustment, and testing.

(a) Safety valves must be designed, constructed, adjusted and tested in accordance with PG-67 through PG-72 of the ASME Code section I except as indicated in this subpart.

(b) The nominal size of a safety valve as used in this specification means the nominal diameter of the inlet opening.

(c) A safety valve must—

(1) Be between ¾ and 4 inches nominal pipe size;

(2) Have flanged or screwed inlet and outlet connections except that welded end inlets may be authorized by the Commandant;

(3) Not have screwed inlets larger than 2-inch nominal pipe size;

(4) Be constructed so that no shocks detrimental to the valve or boiler are produced when lifting or closing;

(5) Be designated to pop open instantly and reach full lift and capacity at the maximum accumulation, as determined by the flow rating test prescribed by § 162.002-6(c);

(6) Have a closure after popping that is clean and sharp;

(7) Operate satisfactorily without wire-drawing or chattering at any stage of operation; and

(8) Not have the set pressure exceed 150 p.s.i.

(d) A spring must—

(1) Be designed so that it will not be compressed solid when the valve is discharging at the maximum relieving capacity approved by the Commandant; and

(2) Not show a permanent set exceeding 1 percent of its free length, 10 minutes after being released from a cold compression test closing the spring solid.

(e) The spring may be reset for any pressure not more than 10 percent above or 10 percent below that for which the safety valve is marked.

(f) The huddling device must have a suitable stop for fixing it after adjustment is completed.

§ 162.002-5 Marking.

(a) Each valve must be marked by the manufacturer in accordance with PG-110 of the ASME Code except that the ASME symbol may be omitted.

(b) The official Coast Guard approval number must be marked on each valve in addition to the data required in paragraph (a) of this section. The minimum wording for showing the approval number, which will be assigned by the Commandant (MMT), must be "USCG 162.002/———" or "USCG 162.002 ———."

§ 162.002-6 Procedure for approval.

(a) *General.* Safety valves which are intended for use as described in § 162.002-2 must be approved by the Commandant (MMT), U.S. Coast Guard Headquarters, Washington, D.C. 20593.

(b) *Plan submission.* Manufacturers desiring to secure approval of a design or type of safety valve must submit to the Commandant drawings in triplicate clearly showing the design together with the material specifications of the component parts. If the design is changed, the manufacturer shall submit amended drawings to the Commandant for reapproval.

(c) *Preapproval tests.* Before approval is granted, manufacturers must have flow tests conducted in accordance with PG-69 of the ASME Code. The manufacturer must submit evidence that such tests have been conducted in the form of certification of ASME capacities by the National Board of Boiler and Pressure Vessel Inspectors or in the form of a copy of the capacity test data report and a table of relieving capacities for each size of valve for which approval is required. Such data must be forwarded by the manufacturer to the Commandant (MMT) with plan submission.

Subpart 162.012—Safety Valves (Steam Service Not in Excess of 30 Pounds Per Square Inch Gage)

AUTHORITY: R.S. 4417a, as amended, 4418, as amended, 4426, as amended, 4433, as amended, 4488, as amended, 4491, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, sec. 3, 54 Stat. 347, as amended, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 392, 404, 411, 481, 489, 367, 1333, 50 U.S.C. 198; E.O. 11239, July 31, 1965, 30 FR 9671, 3 CFR. 1965 Supp.

§ 162.012-1 Applicable specifications, and referenced material.

(a) There are no other specifications applicable to this subpart except as noted in this subpart.

(b) The following referenced material from industry standards of the issue in effect on the date safety valves are manufactured shall form a part of the regulations of this subpart (see §§ 2.75-17 through 2.75-19 of Subchapter A (Procedures Applicable to the Public) and Subpart 50.15 of Subchapter F (Marine Engineering) of this chapter):

(1) ASME (American Society of Mechanical Engineers) Code (see § 50.15-5 of Subchapter F (Marine Engineering) of this chapter): The following paragraph from section IV of the ASME Code:

(i) HG-402, flow tests, see §§ 162.012-6(c) and 162.012-7(c).

(c) A copy of this specification and the referenced material listed in this section shall be kept on file by the manufacturer, together with the approved plans, specifications, and certificate of approval. It is the manufacturer's responsibility to have the latest issue, including addenda and changes, of the referenced material on hand when manufacturing equipment under this subpart.

(1) The ASME Code may be obtained from the American Society of Mechanical Engineers, United Engineering Center, 345 East 47th Street, New York, N.Y. 10017.

(Sec. 552, 80 Stat. 383, as amended; 5 U.S.C. 552)

[CGFR 68-82, 33 FR 18905, Dec. 18, 1968]

§ 162.012-2 Scope.

This specification covers requirements for the design, construction and testing of spring loaded safety valves intended for use on steam heating boilers and unfired steam generators designed for pressures not exceeding 30 pounds per square inch and installed on merchant vessels subject to inspection by the Coast Guard.

[CGFR 68-82, 33 FR 18905, Dec. 18, 1968]

§ 162.012-3 Materials.

(a) The materials used in the manufacture of safety valves shall conform to the applicable requirements of Subchapter F (Marine Engineering), except as otherwise specified in this subpart.

(b) Bodies of safety valves may be made of forged steel, cast steel, malleable iron, cast iron, cast bronze, or of such other equivalent material as may be approved by the Commandant.

(c) The seats and disks shall be of suitable corrosion resistant material. Seats or disks of cast iron or malleable iron are prohibited. Springs shall be of best quality spring steel consistent with the design of the valve and the service requirements.

(d) Non-metallic material except for gaskets and packing is not permitted in the construction of the safety valves, as pressure parts.

[CGFR 52-43, 17 FR 9538, Oct. 18, 1952]

§ 162.012-4 Construction and workmanship.

(a) Safety valves shall be of the direct spring-loaded pop type, or of such other type as may be approved by the Commandant. Lever or weight-loaded safety valves are prohibited.

(b) The nominal size of a safety valve must be the nominal diameter of the inlet opening. No safety valve shall be smaller than ¾ inch nor larger than 4 inches nominal pipe size. Safety valves shall have flanged, welding end or screwed inlet and outlet connections. The inlet opening shall have an inside diameter equal to or greater than the seat diameter.

(c) All safety valves shall be so constructed that the failure of any part cannot obstruct the free and full discharge of steam from the valve.

(d) Safety valves shall be of the angle type fitted with side outlet discharge connections.

(e) Safety valves shall be constructed so that no shocks detrimental to the valve or boiler are produced when lifting or closing. Safety valves shall be designed to pop open instantly and reach full lift and capacity at the maximum accumulation. Valve closure after popping shall be clean and sharp. Safety valves shall operate satisfactorily without wiredrawing and chattering at any stage of operation.

(f) (1) Springs shall be so designed that they will not be compressed solid when the valve is discharging at the maximum rated relieving capacity.

(2) Springs used in safety valves shall not show a permanent set exceeding 1 percent of their free length 10 minutes after being released from a cold compression test closing the spring solid.

(3) Springs of safety valves except those for use on boilers set at 15 pounds per square inch may be reset for any pressures not more than 10 percent above or 10 percent below that for which the valve is marked. The springs of safety valves of boilers set at 15 pounds per square inch shall not be reset at a higher pressure after they are adjusted by the manufacturer.

(g) Each safety valve shall have a suitable lifting device which will positively lift the disk from its seat at least 1/16 inch when there is no pressure on the boiler.

(h) Safety valves of 1 ½ inches size and below shall be tapped for not less than ⅛-inch pipe and safety valves above 1½ inches size shall be tapped for not less than ¼-inch pipe size drain at the lowest point where liquid can collect.

[CGFR 52-43, 17 FR 9538, Oct. 18, 1952, as amended by CGFR 72-59R, 37 FR 6190, Mar. 25, 1972]

§ 162.012-5 Marking.

(a) Each safety valve shall be plainly marked by the manufacturer in such a way that the markings will not be obliterated in service. The markings may be stamped or cast on the valve body or stamped or cast on a plate securely fastened to the body, and shall contain the following information:

(1) The name or identifying trademark of the manufacturer.

(2) Manufacturer's design or type number.

(3) Size———inches. (The pipe size of the valve inlet.)

(4) Set pressure———p.s.i.

(5) Rated capacity———pounds per hour.

(6) Coast Guard approval number. The minimum wording shall be "USCG 162.012/* *" or "USCG 162.012-* *".

[CGFR 68-82, 33 FR 18906, Dec. 18, 1968]

§ 162.012-6 Flow rating tests.

(a) The maximum rated capacity of safety valves shall be determined by actual steam flow at the following pressures:

(1) For set pressures not exceeding 15 pounds per square inch, at 5 pounds per square inch over the set pressure.

(2) For set pressures exceeding 15 pounds per square inch, at 3 percent over the set pressure.

(b) Tests shall be made to determine the lift, popping and blowdown pressures, and the capacity of at least three valves, each of three representative sizes of each design and type.

(c) Flow tests shall be conducted in accordance with paragraph HG-402 of section IV of the ASME Code.

[CGFR 68-82, 33 FR 18906, Dec. 18, 1968]

§ 162.012-7 Procedure for approval.

(a) *General.* Safety valves intended for use on heating boilers and unfired steam generators installed on vessels subject to Coast Guard inspection shall be approved by the Commandant (MMT), U.S. Coast Guard, Washington, D.C. 20591.

(b) *Plan submittal.* Manufacturers desiring to secure approval of a new design or type of safety valve shall submit drawings in triplicate clearly showing the design, together with material specifications of the components. In the event the design is changed after receiving initial approval, amended drawings shall be submitted to the Commandant for reapproval.

---

* *Number to be assigned by the Commandant.

(c) *Preapproval tests.* (1) Before approval is granted, manufacturers shall have flow tests conducted in accordance with § 162.012-6. The manufacturer shall submit evidence that such tests have been conducted in the form of Certification of ASME Capacities by the National Board of Boiler and Pressure Vessel Inspectors, or by submitting a copy of flow test report ASME Form H-1, and a table of relieving capacities for each size valve for which approval is required. Such data shall be forwarded to the Commandant with plan submission.

(2) Reports of conducted tests on designs of safety valves different from those previously approved shall be submitted by the manufacturer when requesting approval for different designs.

[CGFR 68-82, 33 FR 18906, Dec. 18, 1968]

Subpart 162.013—Relief Valves (Hot Water Heating and Hot Water Supply Boilers)

AUTHORITY: R.S. 4417a, as amended, 4418, as amended, 4426, as amended, 4433, as amended, 4488, as amended, 4491, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, sec. 3, 54 Stat. 347, as amended, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 392, 404, 411, 481, 489, 367, 1333, 50 U.S.C. 198; E.O. 11239, July 31, 1965, 30 FR 9671, 3 CFR 1965 Supp.

§ 162.013-1 Applicable specifications, and referenced material.

(a) There are no other specifications applicable to this subpart except as noted in this subpart.

(b) The following referenced material from industry standards of the issue in effect on the date relief valves are manufactured shall form a part of the regulations of this subpart (see §§ 2.75-17 through 2.75-19 of Subchapter A (Procedures Applicable to the Public) and Subpart 50.15 of Subchapter F (Marine Engineering) of this chapter):

(1) ASME (American Society of Mechanical Engineers) Code (see § 50.15-5 of Subchapter F (Marine Engineering) of this chapter): The following paragraph from section IV of the ASME Code:

(i) HG-402, flow tests, see §§ 162.013-6(c) and 162.013-7(c).

(c) A copy of this specification and the referenced material listed in this section shall be kept on file by the manufacturer, together with the approved plans, specifications and certificate of approval. It is the manufacturer's responsibility to have the latest issue, including addenda and changes, of the referenced material on hand when manufacturing equipment under this subpart.

(1) The ASME Code may be obtained from the American Society of Mechanical Engineers, United Engineering Center, 345 East 47th Street, New York, N.Y. 10017.

(Sec. 552, 80 Stat. 383, as amended; 5 U.S.C. 552)

[CGFR 68-82, 33 FR 18906, Dec. 18, 1968]

§ 162.013-2 Scope.

(a) This specification covers requirements for the design, construction and testing of relief valves on hot water heating and hot water supply boilers designed for pressure not exceeding 30 pounds per square inch and installed on merchant vessels subject to inspection by the Coast Guard.

[CGFR 68-82, 33 FR 18906, Dec. 18, 1968]

§ 162.013-3 Materials.

(a) The materials used in the manufacture of relief valves shall conform to the applicable requirements of Subchapter F (Marine Engineering), except as otherwise specified in this subpart.

(b) Bodies of relief, valves may be made of forged steel, cast steel, malleable iron, cast iron, or cast bronze, or of such other equivalent material as may be approved by the Commandant.

(c) The seats and disks shall be of material suitable to resist corrosion Seats and disks of cast iron or malleable iron shall not be used. Non-metallic materials may be used in the construction of relief valves where approved by the Commandant, provided such materials are not susceptible to failure due to deterioration or vulcanization when subjected to temperatures not exceeding 275 degrees F.

(d) Springs shall be of best quality steel consistent with the design of the valve and the service requirement.

[CGFR 52-43, 17 FR 9539, Oct. 18, 1952]

§ 162.013-4 Construction and workmanship.

(a) Relief valves shall be of the spring-loaded type without guide disks on the pressure side of the valve, or of such other type as may be approved by the Commandant. Lever or weight-loaded relief valves are prohibited.

(b) The nominal size of a relief valve shall be the inside diameter of the inlet opening to the individual valve disk. No relief valve shall be smaller than ¾ inch nor larger than 4 inches nominal pipe size. The inlet opening shall have an inside diameter equal to or greater than the seat diameter. In no case shall the minimum opening through any part of the valve be less than ¼ inch diameter or its equivalent area.

(c) All relief valves shall be so constructed that the failure of any part cannot obstruct the free and full discharge of liquid from the valve.

(d) Relief valves shall be of the angle type fitted with side outlet connections.

(e) (1) Springs shall be so designed that they will not be compressed solid when the valve is discharging at the maximum rated relieving capacity.

(2) Springs used in relief valves shall not show a permanent set exceeding 1 percent of their free length 10 minutes after being released from a cold compression test closing the spring solid.

(3) Springs shall not be reset for any pressures more than 10 percent above or 10 percent below that for which the valve is marked.

(f) Each relief valve shall have a suitable lifting device which will positively lift the disk from its seat at least ¹⁄₁₆ inch when there is no pressure on the boiler.

(g) Relief valves shall be so constructed that no shocks detrimental to the valve or boiler are produced when lifting or closing. The relief valves shall operate without pounding or pulsation and shall not chatter at any stage of operation.

[CGFR 52-43, 17 FR 9539, Oct. 18, 1952]

§ 162.013-5 Marking.

(a) Each relief valve shall be plainly marked in such a way that the markings will not be obliterated in service. The markings may be stamped or cast on the valve body or stamped or cast on a plate securely fastened to the body, and shall contain the following information:

(1) The name or identifying trademark of the manufacturer.

(2) Manufacturer's design or type number.

(3) Size———inches. (The nominal pipe size of the valve inlet.)

(4) Set pressure———p.s.i.

(5) Rated capacity———B.t.u. per hour.

(6) Coast Guard approval number. The minimum wording shall be "USCG 162.013/ * *" or "USCG 162.013-* *"

[CGFR 68-82, 33 FR 18906, Dec. 18, 1968]

§ 162.013-6 Flow rating tests.

(a) The maximum rated capacity of relief valves shall be determined by actual steam flow at a pressure of 10 percent over the set pressure but not less than 3 pounds per square inch. The tests shall be made with steam, and in a manner closely approximating actual operating conditions of steam boilers. For determining the B.t.u. discharge capacity of relief valves for hot water boilers, the weight of steam in pounds per hour shall be multiplied by 1,000.

(b) For relief valves with metallic discs, tests shall be made to determine the popping and blowdown pressures, and capacity of at least three valves each of three representative sizes of each design or type.

(c) Flow tests shall be conducted in accordance with paragraph HG-402 of section IV of the ASME Code.

[CGFR 68-82, 33 FR 18906, Dec. 18, 1968]

§ 162.013-7 Procedure for approval.

(a) *General.* Relief valves for use on hot water heating and hot water supply boilers installed on vessels subject to Coast Guard inspection shall be approved by the Commandant (MMT), U.S. Coast Guard, Washington, D.C. 20591.

---

* *Number to be assigned by the Commandant.

(b) *Plan submittal.* Manufacturers desiring to secure approval of a new design or type of relief valve shall submit drawings in triplicate clearly showing the design of same together with material specifications of the component parts. In the event the design is changed, amended drawings shall be submitted to the Commandant for reapproval.

(c) *Preapproval tests.* (1) Before approval is granted, manufacturers of relief valves shall have flow tests conducted in accordance with § 162.013-6. The manufacturer shall submit evidence that such tests have been conducted in the form of certification of ASME Capacities by the National Board of Boiler and Pressure Vessel inspectors, or by submitting a copy of the flow test report, ASME form H-1 and a table of relieving capacities for each valve for which approval is requested. Such data shall be forwarded to the Commandant with plan submission.

(2) Reports of conducted tests on designs of relief valves different from those previously approved shall be submitted by the manufacturer when requesting approval for different designs.

[CGFR 68-82, 33 FR 18907, Dec. 18, 1968]

Subpart 162.014—Fusible Plugs for Merchant Vessels

AUTHORITY: R.S. 4417a as amended, 4418, as amended, 4426, as amended, 4433, as amended, 4488, as amended, 4491, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, sec. 3, 54 Stat. 347, as amended, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 392, 404, 411, 481, 489, 367, 1333, 50 U.S.C. 198; E.O. 11239, July 31, 1965, 30 FR 9671, 3 CFR, 1965 Supp.

SOURCE: CGFR 51-55, 16 FR 11965, Nov. 28, 1951, unless otherwise noted.

§ 162.014-1 Applicable specifications, and referenced material.

(a) *Specifications.* The following specifications, of the issue in effect on the date fusible plugs are manufactured, shall form a part of the regulations of this subpart (see §§ 2.75-17 through 2.75-19 of Subchapter A (Procedures Applicable to the Public) and Subpart 50.15 of Subchapter F (Marine Engineering) of this chapter:

(1) ASTM (American Society for Testing and Materials) standard specifications (see § 50.15-15 of Subchapter F (Marine Engineering) of this subchapter.

B-61, Specification for steam or valve bronze castings.

B-143, Specification for tin-bronze, and leaded tin-bronze sand castings.

(b) *Copies on file.* A copy of this specification and the referenced material listed in this section shall be kept on file by the manufacturer, together with copies of letters of acceptance issued by the Coast Guard for heats of fusible plugs meeting Coast Guard requirements.

(1) The ASTM specifications may be obtained from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pa. 19108.

(Sec. 552, 80 Stat. 383, as amended; 5 U.S.C. 552)

[CGFR 68-82, 33 FR 18907, Dec. 18, 1968]

§ 162.014-2 General requirements.

(a) The manufacture and testing of water-side and fire-side fusible plugs intended for use in boilers installed on merchant vessels subject to inspection by the Coast Guard shall be in accordance with the requirements in this subpart.

§ 162.014-3 Types.

(a) Water-side plugs are fusible plugs which are inserted from the water-side of the boiler plate, flue, or tube to which they are attached.

(b) Fire-side plugs are fusible plugs which are inserted from the fire-side of the boiler plate, flue, or tube to which they are attached.

§ 162.014-4 Materials.

(a) *Casings.* The casings of fusible plugs shall be made of bronze meeting the minimum requirements of A.S.T.M. specification B-61, or B-143, grade 1A or 1B.

(b) *Fillings.* Fusible plugs shall be filled with material of the following composition:

	Percent
Pure tin, minimum	99.3
Copper, maximum	.5
Lead, maximum	.1
Total impurities, maximum	.7

§ 162.014-5 Construction and workmanship.

(a) The casings of fusible plugs shall be machined to the dimensions not less than those shown in Figure 162.014-5. Sketch A for ⅜-inch (i.p.s.) water-side plugs, Sketch B for ½-inch (i.p.s.) and larger water-side plugs, Sketch C for ½-inch (i.p.s.) and larger fire-side plugs, and Sketch D for ⅜-inch (i.p.s.) fire-side plugs. All dimensions are minimum. The minimum length of the fusible filling shall be increased at least 1/16-inch for each 1/64-inch increase of the minimum diameter for the fusible filling.

(b) The bore of the casing shall be filled with fusible metal from the water end to the point of least diameter of the bore. The tin filling shall be carefully alloyed to the casing.

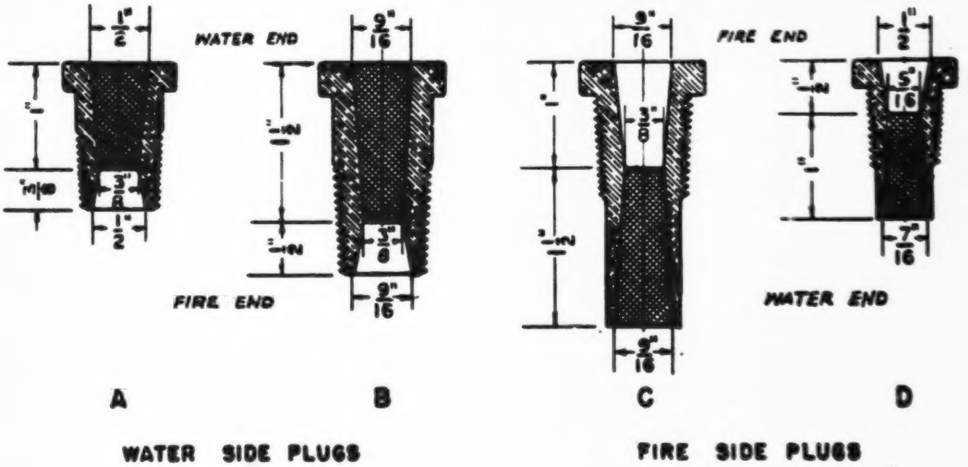


FIGURE 162.014-5.—Acceptable fusible plugs.

NOTE

(1) All threads are USA Standard taper pipe threads.

(2) All dimensions are minimum. The minimum length of the fusible filling shall be increased at least 1/16" for each 1/64" increase of the minimum diameter for the fusible filling.

[CGFR 51-55, 16 FR 11965, Nov. 28, 1951, as amended by CGFR 68-82, 33 FR 18907, Dec. 18, 1968]

§ 162.014-6 Inspections and tests.

(a) *Inspections.* Fusible plugs specified by this subpart are not subject to inspection at the place of manufacture.

(b) *Tests.* Fusible plugs are specified by this subpart shall be subject to the tests prescribed in this subpart. The manufacturer shall bear the cost of such tests.

(1) *Number of test samples.* Two sample plugs shall be selected at random from each heat or lot of 500 plugs or fraction thereof, for physical test and chemical analysis. (See § 162.014-8.)

(2) *Impact test.* The filling of one sample plug shall be tested for tightness by striking the small end of the plug three blows equivalent to 5 foot-pounds of energy per blow. If these tests reveal a loose filling the entire lot or heat shall be rejected.

(3) *Chemical analysis.* The casing of one sample plug shall be tested for chemical analysis by drilling or cutting the sample casing in such a manner as to be representative of the entire cross-section. The filling of one sample test plug shall be melted out of the casing by a ring burner and caught in a clean graphite crucible to be used as a sample for check analysis. The chemical compositions thus determined shall conform to the requirements specified in § 162.014-4. Failure to comply with these requirements shall be cause for rejection of the entire lot or heat.

(4) *Alloying test.* The inside of the casing used for chemical analysis shall show that the tin filling was properly alloyed to the casing. Evidence of improper or incomplete alloying shall be cause for rejection of the entire lot or heat.

§ 162.014-7 Marking.

(a) The name or trade-mark of the manufacturer shall be stamped on the face of the casing for identification.

(b) All fusible plugs shall be numbered in accordance with the number of the heat from which the plugs were filled. For example, the first pouring shall be number 1, and all plugs filled from this heat shall be numbered 1; the next pouring shall be number 2, and all plugs filled from this heat shall be numbered 2, etc. The heat number shall be plainly stamped on the large end of the filling. When more than 500 plugs are poured from one heat, the plugs shall be subdivided into lots of not more than 500. When the heat is subdivided, the number of the lot shall also be plainly stamped on the large end of the filling. The first lot of the heat shall be numbered 1, the next lot 2, etc.

(c) The heat and lot numbers shall be not less than 1/12 inch in height.

§ 162.014-8 Procedure of acceptance of fusible plugs.

(a) *General.* A fusible plug manufacturer who desires to have his product accepted for marine use shall submit a request to the Commandant, U.S. Coast Guard Headquarters, Washington, D.C. 20591. The manufacturer will then be notified to send the required test samples (see § 162.014-6(b)) to an acceptable test laboratory for physical and chemical tests required by § 162.014-6. The test samples furnished shall bear the same number as the heat or lot it was selected from and shall be representative of the fusible plugs of such heat or lot.

(b) *Forwarding of letter of transmittal.* At the time the samples are sent to the test laboratory the manufacturer shall forward direct to the Commandant (MMT), U.S. Coast Guard Headquarters, Washington, D.C. 20591, a letter containing the following information and a copy of this letter shall also be forwarded to the test laboratory:

(1) Number of heat and lot.

(2) Size and type of fusible plugs manufactured from each heat.

(3) Number of fusible plugs manufactured from each heat.

(4) Number of samples of fusible plugs forwarded to test laboratory from each heat.

(5) Name of manufacturer or trademark stamped on casing of fusible plug.

(c) *Forwarding of test laboratory's report.* The original test laboratory's report of the physical test and chemical analysis of sample fusible plugs for each heat or lot shall be forwarded to the Commandant (MMT), U.S. Coast Guard Headquarters, Washington, D.C. 20591.

[CGFR 68-82, 33 FR 18907, Dec. 18, 1968]

Subpart 162.016—Flame Arresters for Tank Vessels

AUTHORITY: R.S. 4417a, as amended, 4491, as amended, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 489, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026.

SOURCE: CGFR 50-9, 15 FR 1679, Mar. 25, 1950, unless otherwise noted.

§ 162.016-1 Applicable specifications.

(a) There are no other specifications applicable to this subpart.

(b) Copies of the approved plans, specifications and the certificate of approval shall be kept on file by the manufacturer. They shall be kept for a period consisting of the duration of the approval and 6 months after termination of approval.

[CGFR 50-9, 15 FR 1679, Mar. 25, 1950, as amended by CGFR 65-16, 30 FR 10900, Aug. 21, 1965]

§ 162.016-2 Type.

(a) This specification covers the design and construction of flame arresters of the type intended for use in venting systems on tank vessels transporting inflammable or combustible liquids.

(b) The term "flame arrester" means any device or assembly of a cellular, tubular, or baffle arrangement or such other type as may be approved by the Commandant which is suitable for arresting the propagation of flame into enclosed spaces containing explosive vapors.

§ 162.016-3 Materials, construction, and workmanship.

(a) Flame arrester housing and grid shall be of a suitable corrosion resistant material as may be approved by the Commandant.

(b) Nonmetallic materials shall not be permitted in the construction of the flame arrester, except where gaskets are employed as required by paragraph (c) of this section.

(c) Flame arrester housing shall be gas tight to prevent the escape of vapors. When installed in venting systems subject to pressures above atmospheric, flame arresters shall be fitted with non-combustible gaskets resistant to the product to be carried.

(d) The flame arrester grid assembly shall be fitted in the arrester housing in a manner that will insure tightness of metal-to-metal surface contacts, so that flame propagation will not occur through the joints between the arrester element and the housing.

(e) The design and construction of the flame arresters shall permit easy inspection and cleaning of the flame arrester grid or "tube bank."

(f) Flame arrester grid shall be so designed as to allow minimum restriction to the flow of vapors. Efficient drainage of the arrester grid shall be provided.

(g) Flame arresters for use on cargo tanks shall be of not less than 2½ inches nominal pipe size.

(h) Housing of flame arresters shall be designed to withstand a hydrostatic pressure of at least 125 pounds per square inch without rupturing or showing permanent distortion.

(i) The net free area through the arrester grid shall in no case be less than 1½ times the cross-sectional area of the pipe inlet.

(j) The flame arrester housing may have screwed or flanged pipe connections, or such type of connections as may be approved by the Commandant. If flanged, the thickness and drilling shall comply with the standards for 125 pounds cast iron flanged fittings.

(k) Where the design of the flame arrester does not permit complete drainage of the condensate to the attached cargo tank or vent line, the housing shall be fitted with a plugged drain opening on the side of the atmospheric outlet of not less than ½ inch pipe size.

(l) The device shall be of first class workmanship and shall be free from imperfections which may affect its serviceability.

§ 162.016-4 Inspection and testing.

(a) Flame arresters may be subject to inspection and tests at the plant of the manufacturer. An inspector may conduct such tests and examinations as may be necessary to determine compliance with this specification.

§ 162.016-5 Marking.

(a) Each flame arrester shall be legibly marked with the style, type, or other designation of the manufacturer, the size, and name or registered trademark of the manufacturer.

§ 162.016-6 Procedure for approval.

(a) *General.* Flame arresters of the type intended for use on tank vessels shall be approved for such use by the Commandant, U. S. Coast Guard, Washington, D.C. 20226.

(b) *Drawings and specifications.* Manufacturers desiring approval of a new design or type of flame arrester shall submit drawings in quadruplicate showing the design of the flame arrester, the sizes for which approval is desired, the size and material specifications of component parts, and the detail construction of arrester grid.

(c) *Pre-approval tests.* Before approval is granted, the manufacturer shall have tests conducted, or submit evidence that such tests have been conducted, and that the flame arrester has been found acceptable by the Underwriters' Laboratories, the Factory Mutual Laboratories, or by a properly supervised and inspected test laboratory acceptable to the Commandant, relative to determining the air flow capacity and vapor-air explosion resistance of a representative sample of the flame arrester in each size for which approval is desired. The explosion resistance of the assembly grid shall be determined by the explosion tests and the continuous flame tests. The results of these tests shall indicate the ability of the flame arrester assembly to withstand the vapor-air internal explosion pressures and its effectiveness in arresting the propagation of flame.

[CGFR 50-9, 15 FR 1679, Mar. 25, 1950, as amended by CGFR 65-16, 30 FR 10900, Aug. 21, 1965]

Subpart 162.017—Valves, Pressure-Vacuum Relief and Spill, for Tank Vessels

AUTHORITY: R.S. 4417a, as amended, 4491, as amended, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 489, 50 U.S.C. 198; E.O. 11239, July 31, 1965, 30 FR 9671, 3 CFR, 1965 Supp.

SOURCE: CGFR 50-9, 15 FR 1680, Mar. 25, 1950, unless otherwise noted.

§ 162.017-1 Applicable specifications.

(a) There are no other specifications applicable to this subpart.

§ 162.017-2 Type.

(a) This specification covers the design and construction of pressure-vacuum relief valves and spill valves intended for use in venting systems on all tank vessels transporting inflammable or combustible liquids.

§ 162.017-3 Materials, construction, and workmanship.

(a) The valves shall be of substantial construction and first class workmanship and shall be free from imperfections which may affect its serviceability.

(b) Bodies of pressure-vacuum relief valves and spill valves shall be made of bronze or such corrosion-resistant material as may be approved by the Commandant.

(c) Valve discs, spindles, and seats shall be made of bronze or such corrosion-resistant material as may be approved by the Commandant.

(d) Where springs are employed to actuate the valve discs, the springs shall be made of corrosion-resistant material. Springs plated with corrosion-resistant material are not acceptable.

(e) Flame screens shall be made of corrosion-resistant wire.

(f) Nonmetallic materials will not be permitted in the construction of the valves, except bushings used in way of moving parts and gaskets may be made of nonmetallic material resistant to attack by the product carried. Nonmetallic diaphragms will be allowed where diaphragm failure will not result in unrestricted flow of cargo vapors to the atmosphere nor in an increase in the pressure or vacuum at which the valve normally releases.

(g) The design and construction of the valves shall permit overhauling and repairs without removal from the line.

(h) Valve discs shall be guided by a ribbed cage or other suitable means to prevent binding, and to insure proper seating. Where valve stems are guided by bushings suitably designed to prevent binding and to insure proper seating, the valves need not be fitted with ribbed cages.

(i) The disc shall close tight against the valve seat by metal to metal contact, however, resilient seating seals may be provided if the design is such that the disc closes tight against the seat in case the seals are destroyed or in case they carry away.

(j) Pressure-vacuum relief valves for venting cargo tanks shall be of not less than 2½ inches nominal pipe size.

(k) Bodies of valves shall be designed to withstand a hydrostatic pressure of at least 125 pounds per square inch without rupturing or showing permanent distortion.

(l) The valve discs may be solid or made hollow so that weight material may be added to vary the lifting pressure. If hollow discs are employed, a watertight bolted cover shall be fitted to encase the weight material. The pressure at which the discs open shall not exceed 120 percent of the set pressure.

(m) The free area through the valve seats at maximum lift shall not be less than the cross-sectional area of the valve inlet connection.

(n) Double flame screens of 20 x 20 corrosion-resistant wire mesh with a ½-inch corrosion-resistant separator on a single screen of 30 x 30 corrosion-resistant wire mesh shall be fitted on all openings to atmosphere. The net free area through the flame screens shall not be less than 1½ times the cross-sectional area of the vent inlet from the cargo tanks.

(o) Valve bodies may have screwed or flanged pipe connections, or such types of connections as may be approved by the Commandant. If flanged, the thickness and drilling shall comply with USA standards for 150-pound bronze flanged fittings.

(p) Where design of valve does not permit complete drainage of condensate to attached cargo tank or vent line, the valve body shall be fitted with a plugged drain opening on the side of the atmospheric outlet of not less than ½ inch pipe size.

(q) Relief pressure adjusting mechanisms shall be permanently secured by means of lockwires, locknuts, or other acceptable means.

[CGFR 50-9, 15 FR 1680, Mar. 25, 1950, as amended by CGFR 68-82, 33 FR 18907, Dec. 18, 1968]

§ 162.017-4 Inspections and testing.

(a) Pressure-vacuum relief valves and spill valves may be inspected and tested at the plant of the manufacturer. An inspector may conduct such tests and examinations as may be necessary to determine compliance with this specification.

§ 162.017-5 Marking.

(a) Each valve shall be legibly marked with the style, type or other designation of the manufacturer, the size, pressure and vacuum setting and name or registered trademark of the manufacturer and Coast Guard approval number. The minimum wording for showing the approval number shall be "USCG/162.017/* *" or "USCG 162.017-* *".

[CGFR 68-82, 33 FR 18908, Dec. 18, 1968]

§ 162.017-6 Procedure for approval.

(a) *General.* Pressure-vacuum relief and spill valves intended for use on tank vessels shall be approved for such use by the Commandant (MMT), U.S. Coast Guard, Washington, D.C. 20591.

(b) *Drawings and specifications.* Manufacturers desiring approval of a new design or type of pressure-vacuum relief valve and spill valve shall submit drawings in quadruplicate showing the design of the valve, the sizes for which approval is requested, method of operation, thickness and material specifications of component parts, diameter of seat opening and lift of discs, mesh and size of wire of flame screens.

(c) *Pre-approval tests.* Before approval is granted, the manufacturer shall have tests conducted, or submit evidence that such tests have been conducted, by the Underwriters' Laboratories, the Factory Mutual Laboratories, or by a properly supervised and inspected test laboratory acceptable to the Commandant, relative to determining the lift, relieving pressure and vacuum, and flow capacity of a representative sample of the pressure-vacuum relief valve and spill valve in each size for which approval is desired. Reports of conducted tests, including flow capacity curves, shall be submitted.

[CGFR 50-9, 15 FR 1680, Mar. 25, 1950, as amended by CGFR 68-82, 33 FR 18908, Dec. 18, 1968]

Subpart 162.018—Safety Relief Valves, Liquefied Compressed Gas

AUTHORITY: R.S. 4417a, as amended, 4491, as amended, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 489, 50 U.S.C. 198; E.O. 11239, July 31, 1965, 30 FR 9671, 3 CFR, 1965 Supp.

---

* *Number to be assigned by the Commandant.

§ 162.018-1 Applicable specifications, and referenced material.

(a) There are no other specifications applicable to this subpart except as noted in this subpart.

(b) The following referenced material from industry standards of the issue in effect on the date safety relief valves are manufactured shall form a part of the regulations of this subpart (see §§ 2.-75-17 through 2.75-19 of Subchapter A (Procedures Applicable to the Public) and Subpart 50.15 of Subchapter F (Marine Engineering) of this chapter):

(1) ASME (American Society of Mechanical Engineers) Code (see § 50.-15-5 of Subchapter F (Marine Engineering) of this chapter): The following paragraph from section VIII of the ASME Code:

(i) UG-131, flow rating of valves, see § 162.018-7(a).

(2) CGA (Compressed Gas Association) standard: The following standard of the Compressed Gas Association (see § 50.15-20(a) of Subchapter F (Marine Engineering) of this chapter):

(i) S-1.2.5.2, Flow test data for safety and relief valves for use on pressure vessels, see § 162.018-7(a).

(c) A copy of this specification and the referenced material listed in this section, if used, shall be kept on file by the manufacturer, together with the approved plans, specifications, and certificate of approval. It is the manufacturer's responsibility to have the latest issue, including addenda and changes, of the referenced material on hand when manufacturing equipment under this subpart.

(1) The ASME Code may be obtained from the American Society of Mechanical Engineers, United Engineering Center, 345 East 47th Street, New York, N.Y. 10017.

(2) The CGA standard may be obtained from the Compressed Gas Association, 500 Fifth Avenue, New York, N.Y. 10036.

(Sec. 552, 80 Stat. 383, as amended; 5 U.S.C. 552)

[CGFR 68-82, 33 FR 18908, Dec. 18, 1968]

§ 162.018-2 Scope.

(a) This specification covers requirements for the design, construction and testing of safety relief valves intended for use on unfired pressure vessels containing liquefied compressed gases installed on merchant vessels subject to inspection by the Coast Guard.

[CGFR 52-43, 17 FR 9540, Oct. 18, 1952]

§ 162.018-3 Materials.

(a) The materials used in the manufacture of safety relief valves shall conform to the applicable requirements of Subchapter F (Marine Engineering) of this chapter, except as otherwise specified in this subpart, and shall be resistant to the corrosive or other action of the liquefied compressed gas in the liquid or gas phase.

(b) All pressure containing external parts of valves must be constructed of materials melting above 1700° F. for liquefied flammable gas service. Consideration of lower melting materials for internal pressure-containing parts will be given if their use provides significant improvement to the general operation of the valve. Flange gaskets shall be metal or spiral wound asbestos.

(c) Nonferrous materials shall not be used in the construction of valves for anhydrous ammonia or other service where susceptible to attack by the lading.

(d) The seats and disks shall be of suitable corrosion resistant material. Seats and disks of cast iron or malleable iron shall not be used. Springs shall be of best quality spring steel consistent with the design of the valve and the service requirement.

[CGFR 52-43, 17 FR 9540, Oct. 18, 1952, as amended by CGFR 68-82, 33 FR 18908, Dec. 18, 1968; CGD 72-206R, 38 FR 17230, June 29, 1973]

§ 162.018-4 Construction and workmanship.

(a) Safety relief valves shall be of either the internal or external spring-loaded type, suitable for the intended service.

(b) Safety relief valve body, base, bonnet and internals shall be designed for a pressure of not less than the set-pressure of the valve.

(c) All safety relief valves shall be so constructed that the failure of any part cannot obstruct the free and full discharge of vapors from the valve.

(d) The nominal size of a safety relief valve shall be the inside diameter of the inlet opening to the individual valve disk. No safety relief valve shall be smaller than ¾ inch nor larger than 6 inches. Safety relief valves shall have flanged or welded end inlet connections and either flanged or screwed outlet connections, except outlets exceeding 4 inches in diameter shall be flanged.

(e) Safety relief valves shall be of the angle or straight-through type, fitted with side or top outlet discharge connections.

(f) (1) Springs shall not show a permanent set exceeding 1 percent of their free length 10 minutes after being released from a cold compression test closing the spring solid.

(2) Springs may not be re-set for any pressure more than 10 percent above or 10 percent below that for which the valve is marked.

(3) If the operating conditions of a valve are changed so as to require a new spring under paragraph (f)(2) of this section for a different pressure, the valve shall be adjusted by the manufacturer or his authorized representative.

(g) The design and construction of safety relief valves shall permit easy access for inspection and repair.

(h) Safety relief valves shall be tapped for not less than ¼ inch pipe size drain at the lowest practicable point where liquid can collect.

[CGFR 52-43, 17 FR 9540, Oct. 18, 1952]

§ 162.018-5 Blow-down adjustment and popping tolerance.

(a) Safety relief valves shall be so constructed that no shocks detrimental to the valve or pressure vessel are produced when lifting or closing. Safety relief valves shall be designed to open sharply and reach full lift and capacity at the maximum accumulation. Valve closure after popping shall be clean and sharp. Safety relief valves shall operate satisfactorily without wiredrawing and chattering at any stage of operation.

(b) Safety relief valves having adjustible blow-down construction shall be adjusted to close after blowing down not more than 5 percent of the set pressure. Valves shall be adjusted to pop within a tolerance of plus or minus 3 percent of the set pressure, except that for pressures of 70 p.s.i. and below, the tolerance in popping pressure shall not vary more than plus or minus 2 p.s.i.

[CGFR 52-43, 17 FR 9541, Oct. 18, 1952]

§ 162.018-6 Marking.

(a) Each safety relief valve shall be plainly marked by the manufacturer with the required data in such a way that the marking will not be obliterated in service. The marking may be stamped on the valve or stamped or cast on a plate securely fastened to the valve. The marking shall include the following data:

(1) The name or identifying trademark of the manufacturer.

(2) Manufacturer's design or type number.

(3) Size———inches. (The pipe size of the valve inlet).

(4) Set pressure———p.s.i.

(5) Rated capacity———cubic feet per minute of the gas or vapor (at 60° F. and 14.7 p.s.i.a.).

(6) Coast Guard approval number. The minimum wording for showing approval shall be "USCG 162.018/* *" or "USCG 162.018-* *".

[CGFR 68-82, 33 FR 18908, Dec. 18, 1968]

§ 162.018-7 Flow rating tests.

(a) Flow rating of valves shall be conducted in accordance with UG-131 of section VIII of the ASME Code, S-1.2.5.2 of the Compressed Gas Association Standards, or other procedure approved by the Commandant.

[CGFR 68-82, 33 FR 18908, Dec. 18, 1968]

§ 162.018-8 Procedure for approval.

(a) *General.* Safety relief valves for use on pressure vessels containing liquefied compressed gases shall be approved by the Commandant (MMT), U.S. Coast Guard, Washington, D.C. 20591.

---

* *Number to be assigned by the Commandant.

(b) *Plan submittal.* Manufacturers desiring to secure approval of a new design or type of safety relief valve shall submit in quadruplicate detail drawings showing the valve construction, and material specifications of the component parts. In the event the design is changed, amended drawings shall be submitted to the Commandant for re approval.

(c) *Pre-approval tests.* (1) Prior to approval of safety relief valves by the Commandant, manufacturers shall have capacity certification tests conducted, in accordance with § 162.018-7 or submit satisfactory evidence that such tests have been conducted and approved by The National Board of Boiler and Pressure Vessel Inspectors or by a properly supervised and inspected test laboratory acceptable to the Commandant.

(2) Reports of conducted tests on designs of safety relief valves different from those previously approved shall be submitted by the manufacturer when requesting approval for different designs.

[CGFR 52-43, 17 FR 9540, Oct. 18, 1952, as amended by CGFR 68-82, 33 FR 18908, Dec. 18, 1968]

Subpart 162.027—Combination Solid Stream and Water Spray Firehose Nozzle and Low-Velocity Water Spray Applicator

AUTHORITY: R.S. 4417a, as amended, 4418, as amended, 4426, as amended, 4427, as amended, 4488, as amended, 4491, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, secs. 3, 17, 54 Stat. 347, as amended, 166, as amended, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 392, 404, 405, 481, 489, 367, 1333, 526p, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 2086; 167-20, June 18, 1954, 21 FR 4894; CGFR 56-28, July 24, 1956, 21 FR 5664; 167-38, Oct. 26, 1959, 24 FR 8857, unless otherwise noted.

§ 162.027-1 Applicable specifications.

(a) The following specifications, of the issue in effect on the date combination solid stream and water spray fire hose nozzles are manufactured, form a part of this subpart:

(1) Military specification:

MIL-B-16444, Bronze, Hydraulic (ounce metal): castings.

(2) Federal specification:

WW-C-621, Couplings; hose, cotton (rubber lined) and linen (unlined).

(b) *Copies on file.* Copies of the specifications referred to in this section shall be kept on file by the manufacturer, together with the approved plans and certificate of approval. The Military Specification may be obtained from the Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, Pa., 19120. The Federal Specification may be purchased from the Business Service Center, General Services Administration, Washington, D.C. 20407.

[CGFR 63-25, 18 FR 7872, Dec. 5, 1963, as amended by CGFR 65-9, 30 FR 11486, Sept. 8, 1965]

§ 162.027-2 Type and size.

(a) *Type.* Combination solid stream and water spray firehose nozzles specified by this subpart shall consist essentially of a firehose nozzle body with two discharge outlets, a valve for shut off and directing the flow of water to either outlet and a high-velocity water spray tip. One discharge outlet shall be a straight stream orifice, and the other outlet shall be designed to accommodate either the high-velocity tip or a low-velocity water spray applicator that meets § 162.027-3(b)(2) both of which must be capable of being removed or inserted readily without the use of tools. The low-velocity water spray applicator has an angled tube, a low-velocity water spray head, and a connection for the combination nozzle. Nozzles permitting adjustment to obtain a range of spray patterns will not be considered as meeting the requirements of this subpart.

(b) *Nozzle size.* Combination solid stream and water spray fire hose nozzles shall be of two sizes: one for use on 1½ inch hose, and the other for use on 2½ inch hose.

(c) *Spray tip and head.* Each high-velocity water spray tip and each low-velocity water spray head of a nozzle or applicator for 1½ inch hose must be designed to pass material equal in size to a ⅜ inch diameter ball. Each high-velocity water spray tip and each low-velocity water spray head of a nozzle or applicator for 2½ inch hose must be designed to pass material equal in size to a ½ inch diameter ball.

(46 U.S.C. 390b, 481, and 391a; 49 U.S.C. 1655(b)(1); and 49 CFR 1.46(b) and 1.46(n)(4))

[CGD 76-086, 44 FR 2393, Jan. 11, 1979]

§ 162.027-3 Materials, construction, workmanship, and performance requirements.

(a) *Materials.* The materials shall comply with the requirements outlined in this paragraph. Alternate materials which meet the performance requirements of this subpart will be given special consideration.

(1) *Materials, general.* All materials used in the construction of combination solid stream and water spray fire hose nozzles and applicators shall be of good quality, suitable for the purpose intended, and shall conform to the requirements of this subpart. The use of dissimilar metal in combination shall be avoided if possible but, when such contacts are necessary, provisions shall be made to prevent effects such as galvanic corrosion, freezing of moving parts, and loosening or tightening of joints due to differences in thermal expansion coefficients. Castings shall be free from blow holes, porosity shrinkage defects, cracks, or other injurious defects.

(2) *Materials, specific.* The nozzle body, valve, valve control handle or lever, high-velocity tip, and low-velocity head shall be bronze, complying with Military Specification MIL-B-16444. Other component parts such as applicator tubes, valve seats, springs, gaskets, etc., shall not be limited with regard to materials except for the requirements of paragraph (a)(1) of this section.

(b) *Construction.* The construction of combination nozzles and applicators manufactured in accordance with this subpart shall comply with the requirements outlined in this paragraph. Alternate arrangements which meet the performance requirements of this subpart will be given special consideration.

(1) *General.* The waterways and control valve shall be so arranged that the nozzle operates from shut-off to spray position and then to solid stream, so that it is not necessary to go through solid stream to obtain a spray. Each of the three positions shall have a positive stop or spring-loaded detent to hold the valve at the position while the pressure at the inlet is 100 p.s.i., and shall be clearly marked to indicate the proper location of the lever or handle for the desired use. The 1½-inch nozzle shall have not less than a ⅝-inch solid stream orifice, and the 2½-inch nozzle shall have not less than a ⅞-inch solid stream orifice. The high-velocity water spray tip shall be attached to the body of the nozzle by a short length of chain. The threads on the inlet end of the nozzle shall be American National Standard Fire-Hose Threads, i.e., 9 threads per inch for the 1½-inch size, and 7½ threads per inch for the 2½-inch size.

(2) *Applicators.* The applicator for the 1½-inch nozzles shall be either 4 feet or 10 feet in length.[1] The 4-foot applicator shall have a bend approximately 12 inches from the discharge end, through an angle of 60 degrees, on a 6-to 8-inch radius. The discharge end of the 10-foot applicator shall be bent through an angle of 90 degrees, to a radius of 6 to 8 inches, so that the normal extension is 10 to 12 inches in length. The applicator for the 2½-inch nozzle shall be 12 feet in length, with the discharge end bent through an angle of 90 degrees, to a radius of 6 to 8 inches, so that the normal extension is 10 to 12 inches in length. The bends in the applicators shall be downward and in the vertical plane of the nozzle when the applicator is locked in place. The length specified for each applicator is the straight length of the pipe before bending, and a reasonable tolerance will be acceptable. The inlet end of the applicator shall have a bayonet or other positive but quick operating joint which shall be identical with

---

[1] The 4-foot applicator is intended for 1½-inch size combination nozzles fitted in propulsion machinery spaces containing oil-fired boilers, internal combustion machinery or oil fuel units.

that on the high-velocity water spray tip.

(c) *Workmanship.* Combination nozzles and applicators manufactured in accordance with this subpart shall be of first class workmanship and shall be free from any defects materially affecting their appearance or serviceability

(d) *Performance requirements.* Combination nozzles and applicators manufacturered in accordance with this subpart shall be capable of meeting the test requirements outlined in § 162.027-4.

(46 U.S.C. 390b, 481, and 391a; 49 U.S.C. 1655(b)(1); and 49 CFR 1.46(b) and 1.46(n)(4))

[CGFR 53-25, 18 FR 7872, Dec. 5, 1953, as amended by CGFR 65-9, 30 FR 11486, Sept. 8, 1965; CDG 76-086, 44 FR 2393, Jan. 11, 1979]

§ 162.027-4 Inspections and tests.

(a) *General.* Combination nozzles and applicators specified by this subpart are not inspected at regularly scheduled factory inspections by the Coast Guard; however, the Commander of the Coast Guard District may detail an inspector at any time to visit any place where combination nozzles and applicators are manufactured to check materials and manufacturing methods, and to conduct such tests and examinations as may be required to satisfy himself that combination nozzles and applicators are being manufactured in compliance with the requirements of this specification. The manufacturer shall provide a suitable place and the necessary equipment for the use of the inspector in conducting such tests or examinations at the place of manufacture.

(b) *Solid stream.* With the nozzle three feet above the ground, held at an angle to obtain maximum range, the valve in the solid stream position, and the water flowing at a gage pressure at the inlet to the nozzle of 100 pounds per square inch, the output and effective range of the solid stream orifice in still air shall comply with the requirements in Table 162.027-4(b). The effective range is defined as the extreme limit at which the stream has not lost continuity by breaking into showers of spray, and appears to effectively carry through an opening of 4 feet diameter, as nearly as can be judged by visual observation.

TABLE 162.027-4(b)

Nozzle size	1½-inch	2½-inch.
Output, minimum	90 g.p.m.	225 g.p.m.
Effective range, minimum	55 feet	65 feet.

(c) *High-velocity water spray tip.* With the high-velocity water spray tip in place, the nozzle about 3 feet above the ground, held level, the valve in the water spray position, and the water flowing at a gage pressure at the inlet to the nozzle of 100 pounds per square inch, the output and pattern in still air shall consist of finely divided particles uniformly distributed throughout the discharge cone, and shall comply with the requirements in Table 162.027-4 (c).

TABLE 162.027-4(c)

Nozzle size	1½-inch	2½-inch.
Output	50 g.p.m., −3, +5.	110 g.p.m., −7, +11.
Horizontal projection of spray pattern.	20 feet, minimum.	25 feet, minimum.
Diameter of pattern at point of maximum spread.	6 feet, minimum.	8 feet, minimum.

(d) *Low-velocity water spray head.* (1) With the applicator in place on the nozzle, the low-velocity water spray head in a vertical position pointing downward, about 8 feet above the ground, the valve in the water spray position, and the water flowing at a gage pressure at the inlet of the nozzle of 100 pounds per square inch, the output and pattern in still air shall consist of very finely divided particles uniformly distributed throughout the discharge cone, and shall comply with the requirements in Table 162.027-4(d)(1).

TABLE 162.027-4(d)(1)

Nozzle size	1½-inch	2½-inch.
Output	50 g.p.m., −3, +5	110 g.p.m., −7, +11.
Pattern diameter	16 feet, minimum.	22 feet, minimum.

(2) With the applicator in place on the nozzle, the water flowing at a gage pressure at the inlet of the nozzle of 100 pounds per square inch, bring the low-velocity spray head over the surface of kerosene or water in a tank and measure the distance when it is as close as possible without unduly disturbing the surface or scattering the liquid. The distance under these conditions shall not exceed 2 feet.

(3) *Fire test.* For the purpose of evaluating the effectiveness of the low-velocity water spray head, a fire test with the following set-up shall be used:

A cylindrical tank, having a minimum diameter of 15 feet and a height of approximately 2½ feet above the ground, shall be partially filled with water on which kerosene is floated to a depth of not less than 2½ inches. The surface of the kerosene shall be approximately 12 inches below the top rim of the tank. The kerosene shall be primed with about ½ gallon of gasoline. After ignition, the fire shall be allowed to burn approximately 2 minutes before being attacked. The approach shall be made from the windward side with the water flowing at a gage pressure at the nozzle inlet of 100 p.s.i. This test shall not be conducted out of doors when the wind velocity is greater than 5 miles per hour. The test fire shall be extinguished in not more than 2 minutes for the 1½-inch size and not more than 1 minute and 30 seconds for the 2½-inch size.

(e) *Corrosion tests.* Measure the torque required to turn the valve control handle from the "Spray" position toward the "Solid Stream" position. With the high-velocity spray tip in place, and the valve control handle in the "Spray" position, expose the nozzle to a 20 percent salt water spray for 6 days at 95° F., following which again measure the torque in the same manner. With the high-velocity spray tip in place, submerge the nozzle in a 4 percent salt water solution for 5 minutes with the valve control handle in the "Solid Stream" position and 5 minutes in the "Spray" position, then drain it and set it aside for 2 days, following which again measure the torque in the same manner. The torque required to operate the valve control handle after each test shall be no greater than two pound-feet more than the torque required to operate it with the nozzle in the new condition.

(f) *Ruggedness tests.* With the high-velocity spray tip in place, the nozzle shall be dropped on a concrete floor or slab having a smooth surface from a height of 3 feet four times, as follows: In the first drop the nozzle shall be held vertically so as to land on its tip. In the second drop it shall be held vertically so as to land on the hose end. In the third and fourth drops it shall be held with its axis approximately horizontal so as to land on opposite sides. The high-velocity spray tip shall then be removed and replaced by the applicator with low-velocity spray head, and this complete assembly shall be dropped from a height of 3 feet once, as follows: It shall be held with the axis of the assembly approximately horizontal and the bend of the applicator downward so as to land on the end of the low-velocity tip and bottom of the nozzle body approximately simultaneously. The nozzle body, valve control handle, high-velocity water spray tip, and applicator with low-velocity water spray head shall be sufficiently rugged so that following these drop tests they function properly and meet all the test requirements of this subpart.

[CGFR 53-25, 18 FR 7872, Dec. 5, 1953, as amended by CGFR 65-9, 30 FR 11486, Sept. 8, 1965; CGD 76-086, 44 FR 2393, Jan. 11, 1979]

§ 162.027-5 Marking.

(a) *Nozzles.* Each combination nozzle shall be permanently and legibly marked with the manufacturer's name and model designation in addition to the marking of the valve positions required by § 162.027-3(b)(1).

(b) *Applicators.* Each low-velocity water spray applicator must be permanently and legibly marked with the manufacturer's name and the model designation of the nozzle with which it is used.

(46 U.S.C. 390b, 481, and 391a; 49 U.S.C. 1655(b)(1); and 49 CFR 1.46(b) and 1.46(n)(4))

[CGD 76-086, 44 FR 2393, Jan. 11, 1979]

§ 162.027-6 Procedure for approval.

(a) *General.* Combination solid stream and water spray fire hose nozzles and applicators for use on merchant vessels are approved only by the Commandant, U.S. Coast Guard, Washington, D.C. Correspondence pertaining to the subject matter of this specification shall be addressed to the Commander of the Coast Guard District in which the factory is located.

(b) *Manufacturer's plans and specifications.* In order to apply for approval of combination nozzles and applicators the manufacturer shall submit 4 prints each of detailed plans and specifications, including a complete bill of materials, assembly drawing, and parts drawings descriptive of the arrangement and construction of the device, to the Commander of the Coast Guard District in which the factory is located. Each drawing shall have an identifying number, date, with alterations properly noted, and the model designation identifying the nozzle and applicators involved. These drawings and specifications will be forwarded to the Commandant for examination.

(c) *Pre-approval sample and tests.* After the drawings and specifications have been found to appear satisfactory, at the request of the manufacturer, a marine inspector will be detailed to the factory to observe the production facilities and manufacturing methods, and to examine a pre-approval sample, which will be forwarded to the Commandant for testing, in accordance with § 162.027-4, together with plans and specifications in quadruplicate, revised or corrected as may have been required. Cost of shipping and pre-approval testing shall be borne by the manufacturer.

(d) *Alternate pre-approval tests.* In order to avoid the duplication of tests which may have been done previously by some other recognized testing organization, such as a facility of the U. S. Navy or Underwriters' Laboratories, Inc., the Coast Guard will accept the test data of such organizations. Reports of such tests should be forwarded in quadruplicate by the manufacturer along with the plans and specifications indicated by paragraph (b) of this section, or arrangements made for such organization to forward the reports directly to the Coast Guard. Such reports shall identify the nozzle by name and model designation and by specifications and drawings having revision dates corresponding to the drawings submitted in accordance with paragraph (b) of this section. Such reports shall indicate that the samples tested were compared with the manufacturer's plans and specifications and were found to be in conformance thereto, with any exceptions between the sample and the plans and specifications properly noted. In addition to the results of the various tests, such reports shall show the detailed data on each trial made to arrive at the average results, and the pertinent conditions of the test methods followed, instruments and methods used for measurements, and all arrangements and conditions surrounding the tests, in order to provide a clear presentation not only of the test results, but also of all pertinent facts necessary for a clear understanding and interpretation of such results.

(46 U.S.C. 390b, 481, and 391a; 49 U.S.C. 1655(b)(1); and 49 CFR 1.46(b)) and 1.46(n)(4)

[CGFR 53-25, 18 FR 7873, Dec. 5, 1953, as amended by CGD 76-086, 44 FR 2394, Jan. 11, 1979]

Subpart 162.028—Extinguishers, Fire, Portable, Marine Type

AUTHORITY: R.S. 4417a, as amended, 4426, as amended, 4488, as amended, 4491, as amended, secs. 1, 2, 49 Stat. 1544, 1545 as amended, secs. 8, 17, 3, 54 Stat. 165 as amended, 166, as amended, 347, as amended, sec. 3, 70 Stat. 152, sec. 4, 67 Stat. 462, and sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 404, 481, 489, 367, 526g, 526p, 1333, 390b, 43 U.S.C. 1333, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-15, Jan. 3, 1955, 20 FR 820; 167-20, June 18, 1956, 21 FR 4894; CGFR 56-28, July 24, 1956, 21 FR 5659; 167-38, Oct. 26, 1959, 24 FR 8857.

SOURCE: CGFR 60-36, 25 FR 10640, Nov. 5, 1960, unless otherwise noted.

§ 162.028-1 Applicable specifications.

(a) There are no other Coast Guard specifications applicable to this subpart.

§ 162.028-2 Classification.

(a) Every portable fire extinguisher shall be classified as to type and size as specified in § 76.50-5 (Subchapter H—Passenger Vessels) of this chapter.

§ 162.028-3 Requirements.

(a) *General.* Every portable fire extinguisher shall conform to the requirements for listing and labeling by a recognized laboratory, and shall be of such design, materials, and construction as to meet the requirements specified in this section.

(b) *Design and weight.* Every portable fire extinguisher shall be self-contained, i.e., when charged it shall not require any additional source of extinguishing agent or expellant energy for its operation during the time it is being discharged, and it shall weigh not more than 55 pounds, maximum, when fully charged.

(c) *Materials.* Materials used for exposed working parts shall be corrosion-resistant to salt water and spray. Materials used for other exposed parts shall be either corrosion-resistant or shall be protected by a suitable corrosion-resistant coating.

(1) *Corrosion-resistant materials.* The materials which are considered to be corrosion-resistant are copper, brass, bronze, certain copper-nickel alloys, certain alloys of aluminum, certain plastics, and certain stainless steels.

(2) *Corrosion-resistant coatings.* (i) The following systems of organic or metallic coatings for exposed non-working ferrous parts, when applied on properly prepared surfaces after all cutting, forming, and bending operations are completed, are considered to provide suitable corrosion resistance:

(*a*) Bonderizing, followed by the application of zinc chromate primer, followed by one or more applications of enamel; or,

(*b*) Hot-dipped or electrodeposited zinc in thicknesses not less than 0.002 inch; or,

(*c*) Electrodeposited cadmium in thicknesses not less than 0.001 inch; or,

(*d*) Hot-dipped or sprayed aluminum in thicknesses not less than 0.002 inch; or,

(*e*) Copper plus nickel in total thicknesses not less than 0.003 inch, of which the nickel is not less than 0.002 inch, plus any thickness of chrome.

(ii) The metallic platings of less than the thicknesses specified in this paragraph are not acceptable for the protection against corrosion of ferrous parts.

(3) *Decorative platings.* Decorative platings in any thicknesses applied over corrosion-resistant materials and corrosion-resistant coatings are acceptable for either working or non-working parts.

(4) *Dissimilar metals.* The use of dissimilar metals in combination shall be avoided wherever possible, but when such contacts are necessary, provisions (such as bushings, gaskets, or o-rings) shall be employed to prevent such deleterious effects as galvanic corrosion, freezing or buckling of parts, and loosening or tightening of joints due to differences in thermal expansion.

(5) *Suitability of materials.* All extinguishers submitted for approval shall undergo the salt spray test in accordance with paragraph (c)(6) of this section.

(6) *Salt spray tests.* Expose the complete fully charged specimen extinguisher to a 20 percent sodium chloride solution spray at a temperature of 95° F. (35° C.) for a period of 240 hours. The procedures and apparatus described in Method 811 of Federal Test Method Standard No. 151 are suitable. Alternate methods may be found satisfactory if the results are comparable. Following the test, allow the specimen extinguisher to air dry for a period of 48 hours. Following the air drying—

(i) The extinguisher must be capable of being operated and recharged in a normal fashion;

(ii) Any coating required in this section to be corrosion resistant must remain intact and must not be removable (when such removal exposes a material subject to corrosion) by such action as washing or rubbing with a thumb or fingernail;

(iii) No galvanic corrosion may appear at the points of contact or close proximity of dissimilar metals;

(iv) The extinguisher and its bracket, if any, must not show any corrosion, except corrosion that can be easily wiped off after rinsing with tap water, on surfaces having no protective coating or paint; and,

(v) The gage on a stored pressure extinguisher must remain watertight throughout the test.

(d) *Bursting pressure.* For all extinguishers except the carbon dioxide type, the hydrostatic bursting pressure of the extinguisher and component parts which are subjected to pressure, exclusive of the hose, shall be at least five times the maximum working pressure during discharge of the extinguisher at approximately 70° F. During this test, a pressure gauge if fitted will usually be removed to avoid breaking the indicating mechanism, but the gauge shall be capable of withstanding the same test without leaking.

(e) *Vibration resistance.* The complete, fully charged specimen extinguisher, secured in its bracket which is mounted to the test machine, shall be tested in accordance with sections 3.1 through 3.1.4.4 of Military Standard MIL-STD-167. Following this test, there shall be no obvious failures of parts or assemblies, and the specimen shall be capable of being operated satisfactorily without undue effort or special procedures on the part of the operator, and the specimen shall be capable of being recharged satisfactorily in accordance with the directions on the name plate without the use of extraordinary tools or procedures.

(f) *Additional marking.* (1) As part of the usual name plate marking, there shall be included the rated capacity of the extinguisher in gallons, quarts, or pounds, and complete instructions for recharging, including the identification of the recharge materials and of the pressure cartridge or separate container if one is used.

(2) For extinguishers which are not ordinarily discharged or opened during the regular maintenance inspections and tests, the weight of the fully charged extinguisher shall be die-stamped, embossed, or cast in a conspicuous location on the name plate, valve body, or shell of the extinguisher.

(3) Pasted-on type paper or decalcomania labels are not acceptable for any of the required extinguisher markings.

(4) For stored pressure type or cartridge operated type water or antifreeze portable fire extinguishers, each extinguisher name plate shall be marked to indicate whether the extinguisher is to be filled with plain water or with anti-freeze solution. Combination type name plates showing the charge may be either plain water or antifreeze solution will not be permitted.

(5) Recharge packages shall be legibly marked with the name of the recharge and the capacity of contents in gallons, quarts, or pounds, in addition to the usual recharge package marking. Recharge pressure cartridges shall, in addition to the usual marking, also be plainly marked to show the distinctive identifying designation of the cartridge.

(g) *Mounting bracket.* Every portable fire extinguisher shall be supplied with a suitable bracket which will hold the extinguisher securely in its stowage location on vessels or boats, and which is arranged to provide quick and positive release of the extinguisher for immediate use.

(h) *Carbon dioxide type.* Every carbon dioxide type extinguisher shall be fitted with a valve which will withstand a minimum bursting pressure of 6,000 p.s.i., and a discharge hose or tube which will withstand a minimum bursting pressure of 5,000 p.s.i. The hose shall be constructed with either a wire braid or other conducting material for conducting static charges occurring at the discharge nozzle back to the body of the extinguisher.

(i) [Reserved]

(j) *Dry chemical type.* (1) [Reserved]

(2) Every dry chemical stored pressure type portable fire extinguisher, i.e., one which employs a single chamber for both the dry chemical and expellant gas, shall be fitted with a pressure gauge or device to show visual indication of whether or not the pressure in the chamber is in the operating range.

(k) *Toxic extinguishing agents.* Every portable fire extinguisher shall contain only agents which qualify for the Underwriters' Laboratories, Inc., toxicity rating of Group 5 or Group 6, and which in normal fire extinguishing use do not generate decomposition products in concentrations hazardous to life.

(l) *Gauge.* Every pressure gauge used on a portable fire extinguisher shall have an accuracy of at least 2 percent of the scale range for the middle half of the scale conforming to ASME Grade B commercial accuracy. The gauge when new shall be watertight, i.e., with the connection capped or plugged, no water shall penetrate to the interior of the case during submergence one foot below the surface of water for a period of two hours. The gauge shall be constructed of corrosion-resistant materials, so that the pointer or face lettering will not be obliterated by the action of salt water if some leakage should occur after rough handling or extended periods of service. The gauge, when attached to the fire extinguisher, shall pass the salt spray and vibration tests prescribed by § 162.028-3(c) (1) and (e).

(m) *Fire tests.* In addition to the usual fire tests conducted to determine the suitability and adequacy of portable fire extinguishers, additional fire tests, such as those described in National Bureau of Standards Building Materials and Structures Report 150, issued June 14, 1957, may be employed in determining the suitability for "marine type" listing and labeling.

(n) *Additional tests.* Every portable extinguisher may be additionally examined and tested to establish its reliability and effectiveness in accordance with the intent of this specification for a "marine type" portable fire extinguisher when considered necessary by the Coast Guard or by the recognized laboratory.

[CGFR 60-36, 25 FR 10640, Nov. 5, 1960, as amended by CGFR 62-17, 27 FR 9046, Sept. 11, 1962; CGFR 56-28, 29 FR 12726, Sept. 9, 1964; CGFR 64-67, 29 FR 14742, Oct. 29, 1964; CGD 72-214R, 38 FR 6880, Mar. 14, 1973; CGD 73-73R, 38 FR 27354, Oct. 3, 1973]

§ 162.028-4 Marine type label.

(a) In addition to all other marking, every portable extinguisher shall bear a label containing the "marine type" listing manifest issued by a recognized laboratory. This label will include the classification of the extinguisher in accordance with the Coast Guard classification system, and the Coast Guard approval number, thus: "Marine Type USCG Type ———, Size———, Approval No. 162.028/———." All such labels are to be obtained from the recognized laboratory and will remain under its control until attached to product found acceptable under its listing and labeling program.

(b) All such labels are to be obtained only from the recognized laboratory and will remain under its control until attached to product found acceptable under its inspection and labeling program.

[CGFR 60-36, 25 FR 10640, Nov. 5, 1960, as amended by CGFR 64-19, 29 FR 7360, June 5, 1964]

§ 162.028-5 Recognized laboratory.

(a) A recognized laboratory is one which is regularly engaged in the examination, testing, and evaluation of portable fire extinguishers; which has an established factory inspection, listing, and labeling program; and which has special standards for listing and labeling as a "marine type" portable fire extinguisher acceptable to the Commandant as approved for use on merchant vessels and motorboats. The following laboratories are recognized, and the portable fire extinguishers bearing their "Marine type" labels are approved for use on merchant vessels and motorboats:

(1) Underwriters' Laboratories, Inc., mailing address: P.O. Box 247, Northbrook, Illinois.

§ 162.028-6 Examinations, tests, and inspections.

(a) Full examinations, tests, and inspections to determine the suitability of a product for listing and labeling, and to determine conformance of labeled product to the applicable requirements are conducted by the recognized laboratory. Whenever any work is being done on components or the assembly of such product, the manufacturer shall notify the recognized laboratory in order that an inspector may be assigned to the factory to conduct such examinations, inspections, and tests as to satisfy himself that the quality assurance program of the manufacturer is satisfactory, and that the labeled product is in conformance with the applicable requirements.

(b) Manufacturers of listed or labeled marine type portable fire extinguishers shall maintain quality control of the materials used, manufacturing methods, and the finished product so as to meet the applicable requirements, and shall make sufficient inspections and tests of representative samples of the extinguishers and various components produced to maintain the quality of the finished product. Records of tests conducted by the manufacturer shall be made available to the laboratory inspector or to the merchant marine inspector, or both, for review upon request.

(c) Follow-up check tests, examinations, and inspections of product listed and labeled as a "marine type" portable fire extinguisher acceptable to the Commandant as approved for use on merchant vessels and motorboats may be conducted by the Coast Guard, as well as by the recognized laboratory.

(d) The laboratory inspector, or the Coast Guard marine inspector assigned by the Commander of the District in which the factory is located, or both, shall be admitted to any place in the factory where work is being done on listed or labeled product, and either or both inspectors may take samples of parts or materials entering into construction, or final assemblies, for further examinations, inspections or tests. The manufacturer shall provide a suitable place and the apparatus necessary for the performance of the tests which are done at the place of manufacture.

§ 162.028-7 Procedure for listing and labeling.

(a) Manufacturers having a marine-type portable fire extinguisher which they consider has characteristics suitable for general use on merchant vessels and motorboats may make application for listing and labeling as a marine-type portable fire extinguisher by addressing a request directly to a recognized laboratory. The laboratory will inform the submitter as to the requirements for inspection, examinations, and testing necessary for such listing and labeling. The request shall include permission for the laboratory to furnish a complete test report together with a description of the quality control procedures to the Commandant.

(b) The U.S. Coast Guard will review the test report and quality control procedures to determine if the requirements in § 162.028-3 have been met. If this is the case, the Commandant will notify the laboratory that the extinguisher is approved and that when the extinguisher is listed and labeled, it may be marked as being U.S. Coast Guard approved.

(c) If disagreements concerning procedural, technical, or inspection questions arise over U.S. Coast Guard approval requirements between the manufacturer and the laboratory, the opinion of the Commandant shall be requested by the laboratory.

(d) The manufacturer or the laboratory may at any time request clarification or advice from the Commandant on any question which may arise regarding manufacturing and approval of approved devices.

[CGD 72-214R, 38 FR 6880, Mar. 14, 1973]

§ 162.028-8 Termination of listing or labeling.

(a) Listing or labeling as a marine type portable fire extinguisher acceptable to the Commandant as approved for use on inspected vessels and motorboats, may be terminated, withdrawn, cancelled, or suspended by written notice to the recognized laboratory from the Commandant, or by written notice to the manufacturer from the recognized laboratory or from the Commandant, under the following conditions:

(1) When the manufacturer does not desire to retain the service.

(2) When the listed product is no longer being manufactured.

(3) When the manufacturer's own program does not provide suitable assurance of the quality of the listed or labeled product being manufactured.

(4) When the product manufactured no longer conforms to the current applicable requirements.

(5) When service experience or laboratory or U.S. Coast Guard reports indicate a product is unsatisfactory.

(46 U.S.C. 367, 390b, 391a, 404, 481, 526g, 526p, 1333, 49 U.S.C. 1655(b); 49 CFR 1.4(b), 1.46(b))

[CGFR 60-36, 25 FR 10640, Nov. 5, 1960, as amended by CGD 72-214R, 38 FR 6880, Mar. 14, 1973]

Subpart 162.034—International Shore Connections (Ship)

AUTHORITY: R.S. 4417a, as amended, 4418, as amended, 4426, as amended, 4427, as amended, 4488, as amended, 4491, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, secs. 3, 17, 54 Stat. 347, as amended, 166, as amended, sec. 3, 68 Stat. 675: 46 U.S.C. 391a, 392, 404, 405, 481, 489, 367, 1333, 526p, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-20, June 18, 1954, 21 FR 4894; CGFR 56-28, July 24, 1956, 21 FR 5659; 167-38, Oct. 26, 1959, 24 FR 8857.

SOURCE: CGFR 65-9, 30 FR 11486, Sept. 8, 1965, unless otherwise noted.

§ 162.034-1 Applicable specifications.

(a) There are no other specifications applicable to this subpart.

§ 162.034-2 Type.

(a) The international shore connection shall be of one type as specified in this subpart.

§ 162.034-3 Materials, workmanship, and construction.

(a) The connection shall be constructed of brass or bronze suitable for 150 p.s.i. service. The bolts, nuts, and washers shall be of brass or bronze. The gasket shall be of any material suitable for 150 p.s.i. service.

(b) Workmanship shall be first class. Completed units shall be free from imperfections or defects which materially affect appearances or which may affect serviceability.

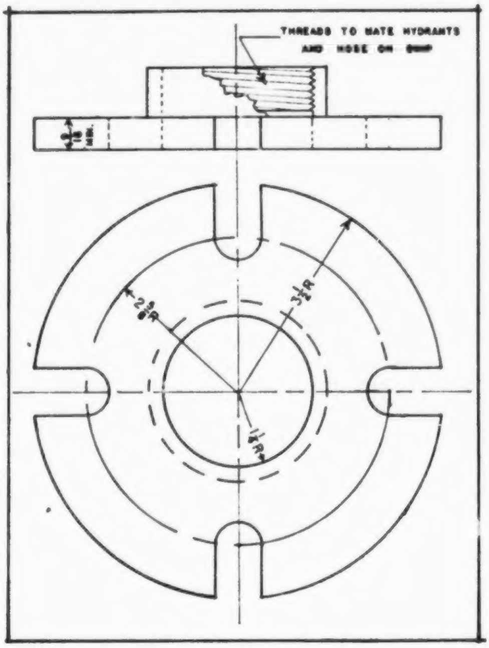


FIGURE 162.034-3(c).

(c) The flange of the connection shall have a flat face on one side and a coupling that will fit the ship's hydrants and hose on the other. The connection and parts shall be in accordance with Figure 162.034-3(c) and the following details:

(1) Connection:

Outside diameter	7 inches.
Inside diameter	2½ inches.
Bolt circle diameter	5¼ inches.
Bolt holes	4, each of ¾-inch diameter equidistantly placed, slotted to the flange periphery.
Flange thickness	9/16-inch minimum.
Flange surface	Flat face.

(2) Bolts, nuts, washers:

Bolts	4, each of ⅝-inch diameter, of 2 inches minimum length, threaded to within 1 inch of bolt head.
Nuts	4, each to fit bolts.
Washers	8, each to fit bolts.

(3) Gasket:

Gasket	Any suited to 150 p.s.i. service.

§ 162.034-4 Inspection and tests.

(a) International shore connections (ship) specified by this subpart are not subject to factory inspections, but may be subject to shipboard inspections to determine conformance to this subpart.

§ 162.034-5 Marking.

(a) No specific marking is required.

§ 162.034-6 Procedure for approval.

(a) International shore connections (ship) are not subject to formal approval, but will be accepted by the marine inspector on the basis of this subpart at annual inspections and reinspections of vessels.

Subpart 162.039—Extinguishers, Fire, Semiportable, Marine Type

Authority: R.S. 4417a, as amended, 4418, as amended, 4426, as amended, 4427, as amended, 4488, as amended, 4491, as amended, secs. 1, 3, 49 Stat. 1544, 1545, as amended, secs. 3, 17, 54 Stat. 347, as amended, 166, as amended, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 392, 404, 405, 481, 489, 367, 1333, 526p, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-20, June 18, 1954, 21 FR 4894; CGFR 56-28, July 24, 1956; 21 FR 5659; 167-38, Oct. 26, 1959, 24 FR 8857.

Source: CGFR 65-9, 30 FR 11487, Sept. 8, 1965, unless otherwise noted.

§ 162.039-1 Applicable specifications.

(a) There are no other Coast Guard specifications applicable to this subpart.

§ 162.039-2 Classification.

(a) Every semiportable fire extinguisher shall be classified as to type and size as specified in § 76.50-5 (Subchapter H—Passenger Vessels) of this chapter.

§ 162.039-3 Requirements.

(a) *General.* Every semiportable fire extinguisher shall conform to the requirements for listing and labeling by a recognized laboratory and shall be of such design, materials, and construction as to meet the requirements specified in this section.

(b) *Design.* Every semiportable extinguisher shall be fitted with hose of sufficient length to a nozzle or nozzles to provide for suitable application of the extinguishing agent to any part of the space protected (a length of pipe may connect the outlet of the supply to the hose connection); shall weigh more than 55 pounds when fully charged; shall be self-contained, i.e., when charged, it shall not require any additional source of extinguishing agent or expellent energy for its operation; and shall provide simple means for immediate operation by a single operator. The design, materials and construction shall provide reliability of operation and performance after non-use for long periods under conditions encountered in marine service.

(c) *Materials.* Materials used for exposed working parts, except those used for inversion mechanism or similar purposes, shall be corrosion-resistant to salt water and spray. Materials used for other exposed parts shall be either corrsion-resistant or shall be protected by a suitable corrosion-resistant coating.

(1) *Corrosion-resistant materials.* The materials which are considered to be corrosion-resistant are copper, brass, bronze, certain copper-nickel alloys, certain alloys of aluminum, certain plastics, and certain stainless steels.

(2) *Corrosion-resistant coatings.* (i) The following systems of organic or metallic coatings for exposed nonworking ferrous parts except for ICC cylinders, when applied on properly prepared surfaces after all cutting, forming, and bending operations are completed, are considered to provide suitable corrosion resistance:

(*a*) Bonderizing, followed by the application of zinc chromate primer, followed by one or more applications of enamel; or,

(*b*) Inorganic zinc coatings; or,

(*c*) Hot-dipped or electrodeposited zinc in thicknesses not less than 0.002 inch; or,

(*d*) Electrodeposited Cadmium in thicknesses not less than 0.001 inch; or,

(*e*) Hot-dipped or sprayed aluminum in thicknesses not less than 0.002 inch; or,

(*f*) Copper plus nickel in total thicknesses not less than 0.003 inch, or which the nickel is not less than 0.002 inch, plus any thickness of chrome.

(ii) The metallic platings of less than the thicknesses specified in this paragraph are not acceptable for the protection against corrosion of ferrous parts.

(3) *Decorative platings.* Decorative platings in any thicknesses applied over corrosion-resistant materials and corrosion-resistant coatings are acceptable for either working or nonworking parts.

(4) *Dissimilar metals.* The use of dissimilar metals in combination shall be avoided wherever possible, but when such contacts are necessary, provisions (such as bushings, gaskets, or o-rings) shall be employed to prevent such deleterious effects as galvanic corrosion, freezing or buckling of parts, and loosening or tightening of joints due to differences in thermal expansion.

(5) *Suitability of materials.* In event of question as to the suitability of the materials (including coatings) used, the salt spray test described in paragraph (c)(6) of this section shall be conducted.

(6) *Salt spray test.* Expose either component parts, subassemblies, or the complete fully charged specimen extinguisher to a 20 percent sodium-chloride solution spray at a temperature of 95° F. (35° C.) for a period of 240 hours. The procedures and apparatus described in Method 811 of Federal Test Method Standard No. 151 are suitable. Alternate methods may be found satisfactory if the results are comparable. Following the test, allow the specimen extinguisher to air dry for a period of 48 hours. Following the air drying, the specimen extinguisher shall be capable of being operated satisfactorily without undue effort or special procedures on the part of the operator, and it shall be capable of being recharged satisfactorily in accordance with the directions on the nameplate without the use of extraordinary tools or procedures.

(d) *Gages.* Every pressure gage used on a semiportable fire extinguisher shall have an accuracy of at least 2 percent of the scale range for the middle half of the scale conforming to ASME Grade B commercial accuracy. The gage when new shall be watertight, i.e., with the connection capped or plugged, no water shall penetrate to the interior of the case during submergence 1 foot below the surface of water for a period of 2 hours. The gage shall be constructed of corrosion-resistant materials, so that the pointer or face lettering will not be obliterated by the action of salt water if some leakage should occur after rough handling or extended periods of service. The gage, when attached to the extinguisher, shall pass the salt spray and vibration tests prescribed by paragraphs (c)(6) and (e) of this section.

(e) *Vibration resistance.* Either component parts, subassemblies, or the complete, fully charged specimen extinguisher, shall be tested in accordance with §§ 3.1 through 3.1.4.4 of Military Standard MIL-STD-167. Following this test, there shall be no obvious failures of parts or assemblies, and they shall be capable of being operated satisfactorily without undue effort or special procedures on the part of the operator, and the extinguisher shall be capable of being recharged satisfactorily in accordance with the directions on the name plate without the use of extraordinary tools or procedures.

(f) *Carbon dioxide type.* Every carbon dioxide type extinguisher shall be fitted with a valve which will withstand a minimum bursting pressure of 6,000 p.s.i., and a discharge hose or tube which will withstand a minimum bursting pressure of 5,000 p.s.i. The hose shall be constructed with either a wire braid or other conducting material for conducting static charges occurring at the discharge nozzle back to the body of the extinguisher.

(g) *Chemical-foam type.* Every chemical foam type semiportable fire extinguisher shall have a nozzle which will provide operating characteristics such that when it is held about 3 feet above the ground at an elevation of approximately 30°, and with the extinguisher and contents both at approximately 70° F. and 120° F., the range of the stream shall not exceed 40 feet, and the major portion of the discharge shall fall between 20 and 40 feet, measured horizontally, from the nozzle. The duration of the effective discharge shall be between 2.5 and 4.0 minutes, effective discharge being considered as occurring while the major portion of the discharge falls beyond 10 feet, measured horizontally, from the nozzle.

(h) [Reserved]

(i) *Toxic extinguishing agents.* Every semiportable fire extinguisher shall contain only agents which qualify for the Underwriters' Laboratories, Inc., toxicity rating of Group 5 or Group 6, and which in normal fire extinguishing use do not generate decomposition products in concentrations hazardous to life. Acceptance of extinguishing agents under these requirements will be determined by the Coast Guard.

(j) *Fire tests.* Fire tests may be employed in determining the suitability for "marine type" listing and labeling.

(k) *Additional tests.* Every semiportable extinguisher may be additionally examined and tested to establish its reliability and effectiveness in accordance with the intent of this specification for a "marine type" semiportable fire extinguisher when considered necessary by the Coast Guard or by the recognized laboratory.

(l) *Additional marking.* (1) As part of the usual nameplate marking, there shall be included the rated capacity of the extinguisher in gallons, quarts, or pounds, and complete instructions for recharging, including the identification of the recharge materials and of the pressure containing cylinder or separate container if one is used.

(2) Pasted-on type paper or decalcomania labels are not acceptable for any of the required extinguisher marking.

(3) Recharge packages shall be legibly marked with the name of the recharge and the capacity of contents in gallons, quarts, or pounds in addition to the usual recharge package marking. Recharge pressure containing cylinders shall, in addition to the usual marking, also be plainly marked to show the distinctive identifying designation of the cylinder.

(m) *Securing means.* Every semiportable fire extinguisher shall be supplied with a suitable means for holding the extinguisher securely in its stowage location on vessels or boats. The materials shall be sufficiently corrosion-resistant or protected against corrosion to withstand the test prescribed by paragraph (c)(6) of this section without showing more than traces of slight corrosion, which may be easily wiped off after rinsing with tapwater.

[CGFR 65-9, 30 FR 11487, Sept. 8, 1965, as amended by CGFR 65-64, 31 FR 563, Jan. 18, 1966; CGD 73-73R, 38 FR 27354, Oct. 3, 1973; CGD 77-039, 44 FR 34133, June 14, 1979]

§ 162.039-4 Marine type label.

(a) In addition to all other marking, every semiportable extinguisher shall bear a label containing the "marine type" listing manifest issued by a recognized laboratory. This label will include the classification of the extinguisher in accordance with the Coast Guard classification system, and the Coast Guard approval number, thus: "Marine Type USCG Type ———, Size ———, Approval No. 162.039/Ex—." All such labels are to be obtained from the recognized laboratory and will remain under its control until attached to product found acceptable under its listing and labeling program.

§ 162.039-5 Recognized laboratory.

(a) A recognized laboratory is one which is regularly engaged in the examination, testing, and evaluation of semi-portable fire extinguishers; which has an established factory inspection, listing, and labeling program; and which has special standards for listing and labeling as a "marine type" semiportable fire extinguisher acceptable to the Commandant as approved for use on merchant vessels and motorboats. The following laboratories are recognized, and the semiportable fire extinguishers bearing their "marine type" labels are approved for use on merchant vessels and motorboats:

(1) Underwriters' Laboratories, Inc., mailing address: Post Office Box 247, Northbrook, Ill., 60062.

§ 162.039-6 Examinations, tests, and inspections.

(a) Full examinations, tests, and inspections to determine the suitability of a product for listing and labeling, and to determine conformance of labeled product to the applicable requirements are conducted by the recognized laboratory. Whenever any work is being done on components or the assembly of such product, the manufacturer shall notify the recognized laboratory in order that an inspector may be assigned to the factory to conduct such examinations, inspections, and tests as to satisfy himself that the quality assurance program of the manufacturer is satisfactory, and that the labeled product is in conformance with the applicable requirements.

(b) Manufacturers of listed or labeled marine type semiportable fire extinguishers shall maintain quality control of the materials used, manufacturing methods, and the finished product so as to meet the applicable requirements, and shall make sufficient inspections and tests of representative samples of the extinguishers and various components produced to maintain the quality of the finished product. Records of tests conducted by the manufacturer shall be made available to the laboratory inspector or to the Coast Guard marine inspector, or both, for review upon request.

(c) Followup check tests, examinations, and inspections of product listed and labeled as a "marine type" semiportable fire extinguisher acceptable to the Commandant as approved for use on merchant vessels and motorboats may be conducted by the Coast Guard, as well as by the recognized laboratory.

(d) The laboratory inspector, or the Coast Guard merchant marine inspector assigned by the Commander of the District in which the factory is located, or both, shall be admitted to any place in the factory where work is being done on listed or labeled product, and either or both inspectors may take samples of parts or materials entering into construction, of final assemblies, for further examinations, inspections, or tests. The manufacturer shall provide a suitable place and the apparatus necessary for the performance of the tests which are done at the place of manufacture.

§ 162.039-7 Procedure for listing and labeling.

(a) Manufacturers having models of extinguishers which they believe are suitable for marine service may make application for listing and labeling of such product as a "marine type" semiportable fire extinguisher which will be acceptable to the Commandant as approved for use on merchant vessels, by addressing a request directly to a recognized laboratory. The laboratory will inform the submitter as to the requirements for inspections, examinations, and testing necessary for such listing and labeling. All costs in connection with the examinations, tests, and inspections, listings and labelings are payable by the manufacturer.

§ 162.039-8 Termination of listing or labeling.

(a) Listing or labeling as a marine type semiportable fire extinguisher acceptable to the Commandant as approved for use on inspected vessels or motorboats may be terminated, withdrawn, canceled, or suspended by written notice to the recognized laboratory from the Commandant, or by written notice to the manufacturer from the recognized laboratory or from the Commandant under the following conditions:

(1) When the manufacturer does not desire to retain the service.

(2) When the listed product is no longer being manufactured.

(3) When the manufacturer's own program does not provide suitable assurance of the quality of the listed or labeled product being manufactured.

(4) When the product manufactured no longer conforms to the current applicable requirements.

Subpart 162.041—Backfire, Flame Control, Gasoline Engines; Flame Arresters; for Merchant Vessels and Motorboats

AUTHORITY: R.S. 4488, as amended, 4491, as amended, secs. 10, 17, 54 Stat. 165, as amended, 166, as amended, 46 U.S.C. 481, 489, 526i, 526p. Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-38, Oct. 26, 1959, 24 FR 8857.

SOURCE: CGFR 65-18, 30 FR 10240, Aug. 18, 1965, unless otherwise noted.

§ 162.041-1 Applicable specifications.

(a) There are no other specifications applicable to this subpart.

(b) Copies of this specification, together with the Certificate of Approval and approved drawings and material specifications, shall be kept on file by the manufacturer.

(c) The word "manufacturer," as used in this specification, means the party who actually accomplishes the final assembly, packaging, or distribution of the device or method of achieving backfire flame control, and makes the actual submission for approval.

§ 162.041-2 Scope.

(a) This specification covers the requirements for and construction of backfire flame arresters intended for installation on carburetor air intakes of internal combustion engines.

(1) The term "backfire flame arrester," as may be approved by the Commandant, refers to an assembly consisting of one or more component parts, such as a grid element and carburetor adapter or such other device, designed and constructed so as to prevent the propagation of backfire flame from within the carburetor and engine air intake system to the surrounding atmosphere.

(b) This specification covers one of the means which are considered acceptable in providing backfire flame control for gasoline engines. The other two means may be found in Subparts 162.042 and 162.043 of this part.

§ 162.041-3 Flame arresters.

(a) *General.* The "backfire flame arrester" shall be designed and constructed as to prevent the propagation of backfire flame from within the carburetor and engine air intake system to the surrounding atmosphere.

(b) *Grid element and carburetor adapter.* A grid element may be of cellular, tubular, or baffle arrangement or such other type, as may be approved by the Commandant, which will prove effective in preventing the propagation of backfire flame. A carburetor adapter if required, shall be compatible with, and provide a suitable connection between the grid element and carburetor air intake. The assembly shall be attached directly to the carburetor. The grid element and adapter may be constructed as an integral unit.

§ 162.041-4 Materials, construction and workmanship.

(a) The flame arrester shall be of first class workmanship and shall be free from manufacturing imperfections which may impair its intended purpose.

(b) The flame arrester shall be of substantial construction and be capable of withstanding the most severe backfire conditions encountered in service without failure, damage, or permanent deformation.

(c) The flame arrester shall be fabricated of corrosion resistant or suitably protected materials, which are capable of withstanding the temperatures and stresses encountered in service. In addition, all materials and finishes used shall be resistant to deterioration by fuels, lubricants and common solvents in a marine atmosphere.

(d) The construction of the flame arrester shall provide for access to the grid element for inspection and cleaning.

(e) There shall be no openings in the flame arrester or its connection to the carburetor through which backfire flame can pass.

(f) The construction of the flame arrester shall provide means of securely fastening both the flame arrester to the carburetor air intake and the component parts to each other. When clamps are used, they shall be affixed to one of the major component parts in such a manner that they cannot be easily removed.

(g) Construction of the flame arrester shall be such that component parts cannot be misaligned during assembly or installation, to an extent that will impair its effectiveness.

(h) The flame arrester shall be so constructed that its effectiveness will not be impaired by vibration or shock under the most severe condition encountered in service.

§ 162.041-5 Inspection and tests.

(a) Backfire flame arresters are subject to inspection by the U.S. Coast Guard at the plant of the manufacturer or at other locations as required. The marine inspector may make examinations as necessary to determine manufacturing conformity with the approved drawings and specifications. The marine inspector shall be admitted to any place in the factory or elsewhere where work is done on backfire flame arresters or component parts.

§ 162.041-6 Marking.

(a) Each major component of an assembly shall be marked with the manufacturer's name and part number. In addition the U.S. Coast Guard approval number shall be marked on that part of the assembly likely to be most readily visible for inspection as installed in the boat. The minimum wording for showing the approval number shall be "USCG App. No. 162.041/* *" or "USCG App. No. 162.041-* *". Several valid approval numbers may appear on a specific flame arrester component or components. However, where this occurs, each assembly shall have one of the numbers marked by an arrow, underlined, or otherwise suitably marked to distinguish it from all nonapplicable numbers.

(b) All marking shall be permanent and legible. Stamping, etching, or other means of permanently imprinting is acceptable. Decals, stenciling, and other such marking methods are not acceptable.

§ 162.041-7 Procedure for approval.

(a) *General.* Backfire flame arresters intended for installation on carburetors of internal combustion engines used on merchant vessels and motorboats are approved only by the Commandant, U.S. Coast Guard, Washington, D.C., 20226. Information and correspondence pertaining to the subject matter of this specification shall be addressed to the Commander of the Coast Guard District in which the factory is located.

(b) *Manufacturer's drawings and specifications.* In order to obtain approval of backfire flame arresters, detailed drawings and specifications, including a complete bill of materials, assembly drawings and part drawings descriptive of the arrangement and construction of the backfire flame arrester shall be submitted in quadruplicate to the Commandant, U.S. Coast Guard. Each drawing shall have an identifying drawing number, date and an identification of the device. The general arrangement or assembly drawing shall include a list of all drawings applicable, together with drawing numbers, alteration numbers and dates when made.

(c) *Sample backfire flame arrester.* A sample backfire flame arrester manufactured in accordance with plans and specifications submitted for approval shall be forwarded to the Commandant.

(d) *Preapproval tests of sample backfire flame arresters.* After the plans and specifications have been approved by the Commandant, representative samples of each backfire flame arrester shall be tested by an acceptable laboratory, such as the Yacht Safety Bureau, Inc., 336 Old Hook Road, Westwood, N.J., 07665 in accordance with test procedures previously approved by the Commandant. The costs of the laboratory tests shall be paid by the manufacturer.

(1) The test of the samples representative of each assembly desired to be approved shall conclusively indicate that, when such backfire flame arresters are subjected to the most severe backfiring conditions encountered in an engine air intake system, the assembly prevents propagation of backfire flame to the surrounding atmosphere without failure, damage or permanent deformation. In addition, a test shall be conducted on the samples submitted to demonstrate the capability of such devices to withstand, without impairment of its effectiveness, the shock, vibration, and corrosive environment which may be encountered under the most severe conditions of service.

(2) In those cases where the backfire flame arresters consist of various combinations of grid elements and adapters and when it appears that testing of all combinations desired to be approved is not necessary, the Commandant will designate those assemblies considered necessary for testing after reviewing the drawings submitted.

(3) The laboratory testing the backfire flame arresters, in accordance

---

* *Additional identifying serial number to be assigned.

with approved procedures, shall furnish to the Coast Guard the original copy of the test report or a certified copy.

(e) *Certificate of approval.* (1) When it is determined that the backfire flame arrester complies with the applicable requirements and after receipt of four sets of drawings and specifications and the satisfactory laboratory test report, the Commandant will approve the device and will issue a certificate of approval, setting forth the type approval number and the conditions governing the approval. This approval is for the complete backfire flame arrester assembly. Component parts of a backfire flame arrester are not individually approved.

(2) No change shall be made in the design or construction of the approved backfire flame arrester without first receiving permission of Commandant. The correspondence should be sent via the Commander of the Coast Guard District in which the factory is located.

Subpart 162.042—Backfire Flame Control, Gasoline Engines; Engine Air and Fuel Induction Systems; for Merchant Vessels and Motorboats

AUTHORITY: R.S. 4488, as amended, 4491, as amended, secs. 10, 17, 54 Stat. 165, as amended, 166, as amended; 46 U.S.C. 481, 489, 526i, 526p. Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-38, Oct. 26, 1959, 24 FR 8857.

SOURCE: CGFR 65-18, 30 FR 10242, Aug. 18, 1965, unless otherwise noted.

§ 162.042-1 Applicable specifications.

(a) There are no other specifications applicable to this subpart.

(b) Copies of this specification, together with the Certificate of Approval and approved drawings and material specifications, shall be kept on file by the manufacturer.

(c) The word "manufacturer" as used in this specification means the party who actually accomplishes the final assembly, packaging, or distribution of the device or method of achieving backfire flame control, and makes the actual submission for approval.

§ 162.042-2 Scope.

(a) This specification covers the requirements for those engines air and fuel induction systems which, because of the method of introducing fuel into the engine, or because of the design of the air intake passages to the cylinders, provide protection equivalent to that of an effective backfire flame arrester.

(b) This specification covers one of the means which are considered acceptable in providing backfire flame control for gasoline engines. The other two means may be found in Subparts 162.041 and 162.043 of this part.

§ 162.042-3 Engine air and fuel induction systems providing backfire flame control.

(a) The engine air and fuel induction system shall be designed and constructed so as to provide protection equivalent to that of an effective backfire flame arrester designed and constructed under Subpart 162.041 of this part.

§ 162.042-5 Inspection and tests.

(a) Approved engine air and fuel induction systems providing backfire flame control are subject to inspection by the U.S. Coast Guard at the plant of the manufacturer, or at other locations as required. The marine inspector may make examinations as necessary to determine manufacturing conformity with the approved drawings and specifications. The marine inspector shall be admitted to any place in the factory or elsewhere where work is done on engine air and fuel induction systems providing backfire flame control or on component parts.

§ 162.042-6 Marking.

(a) The U.S. Coast Guard approval number shall be marked on that portion of the engine likely to be most readily visible for inspection as installed in the boat. The minimum wording for showing the approval number shall be "USCG App. No. 162.042/* *" or "USCG App. No. 162.042-* *." This marking shall indihas accepted the engine for use without an external backfire flame arrester, and shall not imply the approval of the engine.

---

* *Additional identifying serial number to be assigned.

(b) All marking shall be permanent and legible. Stamping, etching or other means of permanently imprinting is acceptable. Decals, stenciling and other such marking methods are not acceptable.

§ 162.042-7 Procedure for approval.

(a) *General.* Engine air and fuel induction systems providing backfire flame control for internal combustion engines used on merchant vessels and motorboats are approved only by the Commandant, U.S. Coast Guard, Washington, D.C., 20226. Information and correspondence pertaining to the subject matter of this specification shall be addressed to the Commander of the Coast Guard District in which the factory is located.

(b) *Manufacturer's drawings and specifications.* In order to obtain approval of an engine air and fuel induction system, detailed drawings and specifications, including a complete bill of material, assembly drawings and part drawings descriptive of the arrangement and construction of the device shall be submitted in quadruplicate to the Commandant, U.S. Coast Guard. Each drawing shall have an identifying drawing number, date, and an identification of the device. The general arrangement or assembly drawing shall include a list of all drawings applicable, together with drawing numbers, alteration numbers, and dates when made.

(c) *Preapproval tests.* After the specifications and plans have been approved by the Commandant, a representative engine utilizing the air and fuel induction system desired to be approved shall be tested by an acceptable laboratory, such as the Yacht Safety Bureau, Inc., 336 Old Hook Road, Westwood, N.J., 07675, in accordance with test procedures previously approved by the Commandant. The costs of the laboratory tests shall be paid by the manufacturer.

(1) The tests shall conclusively indicate that the engine air and fuel induction system proposed for approval when installed on a representative engine will prevent the propagation of backfire flame to the surrounding atmosphere under the most severe engine backfiring conditions expected when in service. In addition, a test shall be conducted to demonstrate the capability of such a device to withstand, without impairment of its effectiveness, the shock, vibration, and corrosive environment which may be encountered under the most severe conditions of service.

(2) The laboratory testing the engine air and fuel induction system, in accordance with approved procedures, shall furnish to the Coast Guard the original copy of the test report or a certified copy

(d) *Certificate of approval.* (1) When it is determined the engine air and fuel induction system complies with the applicable requirements and after receipt of four sets of drawings and specifications and satisfactory test reports, the Commandant will issue a certificate of approval, setting forth the type approval number and conditions governing the approval. The approval granted is for the engine air and fuel induction system which complies with this specification. Component parts of an engine air and fuel induction system are not individually approved.

(2) No change shall be made in the design or construction of approved engine air and fuel induction system without first receiving permission of the Commandant. The correspondence should be sent via the Commander of the Coast Guard District in which the factory is located.

Subpart 162.043—Backfire Flame Control, Gasoline Engines; Engine Air Induction System; for Merchant Vessels and Motorboats

AUTHORITY: R.S. 4488, as amended, 4491, as amended, secs. 10, 17, 54 Stat. 165, as amended, 166, as amended 46 U.S.C. 481, 489, 526i, 526p. Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-38, Oct. 26, 1959, 24 FR 8857

SOURCE: CGFR 65-18, 30 FR 10242, Aug. 18, 1965, unless otherwise noted.

§ 162.043-1 Applicable specifications.

(a) There are no other specifications applicable to this subpart.

(b) Copies of this specification, together with the Certificate of Approval and approved drawings and material specifications, shall be kept on file by the manufacturer.

(c) The word "manufacturer," as used in this specification, means the party who actually accomplishes the final assembly, packaging, or distribution of the device or method of achieving backfire flame control, and makes the actual submission for approval.

§ 162.043-2 Scope.

(a) This specification covers only the requirements for those instances where a manufacturer will be producing vessels having an integrated engine-vessel design and wishes premarketing approval of the engine air induction system. Such engine air induction systems utilize carburetor attachments or air intake ducts designed so that flames produced as a result of engine backfire will be dispersed to the atmosphere outside the vessel in such a manner so as not to endanger the vessel, persons aboard, or nearby vessels and structures. This specification is not intended to require that other installations which meet the intent of this paragraph, in accordance with § 25.35-1(e)(3) of Subchapter C (Uninspected Vessels) of this chapter, need be numbered.

(b) This specification covers one of the means which are considered acceptable in providing backfire flame control for gasoline engines. The other two means may be found in Subparts 162.041 and 162.042 of this part.

§ 162.043-3 Engine air induction systems providing backfire flame control.

(a) The engine air induction system shall be designed and constructed so as to provide protection equivalent to that of an effective backfire flame arrester designed and constructed under Subpart 162.041 of this part.

§ 162.043-4 Materials, construction, and workmanship.

(a) All attachments to the carburetor shall be metallic with flametight connections. The system shall be firmly secured and so constructed that it will withstand vibration, shock, and engine backfire. The system shall be so arranged that backfire flames will not endanger the vessel or persons aboard.

(b) The ducting shall be flametight and shall be fabricated of corrosion resistant or suitably protected materials.

§ 162.043-5 Inspection and tests.

(a) Approved engine air induction systems providing backfire flame control are subject to inspection by the U.S. Coast Guard at the plant of the manufacturer, or at other locations as required. The marine inspector may make examinations as necessary to determine manufacturing conformity with the approved drawings and specifications. The marine inspector shall be admitted to any place in the factory or elsewhere where work is done on engine air induction systems providing backfire flame control or on component parts.

§ 162.043-6 Marking.

(a) The U.S. Coast Guard approval number shall be marked on that portion of the engine-vessel installation likely to be most readily visible for inspection. The minimum wording for showing the approval number shall be "USCG App. No. 162.043/* *" or "USCG App. No. 162.042-* *." This marking shall indicate only that the U.S. Coast Guard has accepted the engine-vessel for use without an external backfire flame arrester, and shall not imply the approval of the engine or vessel.

(b) All marking shall be permanent and legible. Stamping etching or other means of permanently imprinting is acceptable. Decals, stenciling and other such marking methods are not acceptable.

§ 162.043-7 Procedure for approval.

(a) *General.* Engine air induction systems providing backfire flame control for internal combustion engines used on merchant vessels and motorboats are approved only by the Commandant, U.S. Coast Guard, Washington, D.C. 20226. Information and correspondence pertaining to the subject matter of this specification shall be addressed to the Commander of the Coast Guard District in which the factory is located.

---

* *Additional identifying serial number to be assigned.

(b) *Manufacturer's drawings and specifications.* In order to obtain approval of an engine air induction system detailed drawings and specifications, including a complete bill of material, assembly drawings and part drawings descriptive of the arrangement and construction of the device shall be submitted in quadruplicate to the Commandant, U.S. Coast Guard. Each drawing shall have an identifying drawing number, date and an identification of the device. The general arrangement or assembly drawing shall include a list of all drawings applicable, together with drawing numbers, alteration numbers, and dates when made.

(c) *Preapproval tests.* (1) After the plans and specifications have been approved by the Commandant, a representative installation on the engine in a representative type of vessel for which it has been approved shall be examined and checked by a Coast Guard marine inspector.

(2) The marine inspector shall determine manufacturing conformity with the approved plans and specifications. He shall witness tests demonstrating that when the engine is subjected to the most severe backfiring conditions expected in service, the installation effectively disperses the backfire flames to the atmosphere outside the vessel in a manner so as not to endanger the vessel, persons on board, or nearby vessels and structures.

(d) *Certificates of approval.* (1) When it is determined the engine air induction system complies with the applicable requirements and after receipt of four sets of drawings and specifications and satisfactory test reports, the Commandant will issue a certificate of approval, setting forth the type approval number and conditions governing the approval The approval granted is for the engine air induction system which complies with this specification. Component parts of an engine air induction system are not individually approved.

(2) No change shall be made in the design or construction of approved engine air induction systems without first receiving permission of the Commandant. The correspondence should be sent via the Commander of the Coast Guard District in which the factory is located.

Subpart 162.050—Pollution Prevention Equipment

AUTHORITY: 33 U.S.C. 1321(j), 46 U.S.C. 391a, 49 U.S.C. 1655(b)(1), and 49 CFR 1.4(b) and 1.46.

SOURCE: 44 FR 53359, Sept. 13, 1979, unless otherwise noted.

§ 162.050-1 Scope.

(a) This subpart contains—

(1) Procedures for approval of 100 p.p.m. separators, 15 p.p.m. separators, cargo monitors, bilge monitors, and bilge alarms;

(2) Design specifications for this equipment;

(3) Tests required for approval;

(4) Procedures for obtaining designation as a facility authorized to conduct approval tests;

(5) Marking requirements; and

(6) Factory inspection procedures.

§ 162.050-3 Definitions.

(a) "p.p.m." means parts per million by volume of oil in water;

(b) "100 p.p.m. separator" means a separator that is designed to remove enough oil from an oil-water mixture to provide a resulting mixture that has an oil concentration of 100 p.p.m. or less;

(c) "15 p.p.m. separator" means a separator that is designed to remove enough oil from an oil-water mixture to provide a resulting mixture that has an oil concentration of 15 p.p.m. or less;

(d) "Cargo monitor" means an instrument that is designed to measure and record the oil content of cargo residues from cargo tanks and oily mixtures combined with these residues;

(e) "Bilge monitor" means an instrument that is designed to measure and record the oil content of oily mixtures from machinery space bilges and fuel oil tanks that carry ballast;

(f) "Bilge alarm" means an instrument that is designed to measure the oil content of oily mixtures from machinery space bilges and fuel oil tanks that carry ballast and activate an alarm at a set concentration limit; and

(g) "Independent laboratory" means a laboratory that—

(1) Has the equipment and procedures necessary to approve the electrical components described in §§ 162.050-21(b) and 162.050-25(c), or to conduct the test described in § 162.050-37(a); and

(2) Is not owned or controlled by a manufacturer, supplier, or vendor of separators, monitors, or bilge alarms.

§ 162.050-4 Documents incorporated by reference.

(a) The following documents are incorporated by reference into this subpart:

(1) Underwriters Laboratories Standard 913 (as revised April 8, 1976).

(2) "Experimental Statistics", National Bureau of Standards Handbook No. 91 (October 1966).

(3) "Standard Practice for Determination of Precision and Bias of Methods of Committee D-19 on Water, D-2777-77", American Society for Testing and Materials.

(b) The documents listed in this section may be obtained as follows:

(1) The UL standard may be obtained from Underwriters Laboratories, Inc., Publications Stock, 333 Pfingsten Road, Northbrook, Illinois 60062.

(2) The ASTM standard may be obtained from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pa. 19103.

(3) The NBS handbook may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

(c) The documents listed in this section are also on file in the FEDERAL REGISTER library.

(d) Approval to incorporate by reference the materials listed in this section was obtained from the Director of the FEDERAL REGISTER on August 21, 1979.

§ 162.050-5 Contents of application.

(a) An application for approval of a 15 p.p.m. or 100 p.p.m. separator, a cargo or bilge monitor, or a bilge alarm must contain the following information:

(1) A brief description of the item submitted for approval.

(2) The name and address of the applicant and its manufacturing facility.

(3) A detailed description of quality control procedures, in-process and final inspections and tests followed in manufacturing the item, and construction and sales record keeping systems maintained.

(4) Arrangement drawings and piping diagrams of the item that give the information prescribed by § 56.01-10(d) of this chapter.

(5) Detailed electrical plans of the type described in § 111.05-5(d) of this chapter.

(6) An instructions manual containing detailed instructions on installation, operation, calibration and zeroing, and maintenance of the item.

(7) For each monitor and bilge alarm and each control on a separator, the vibration test report described in § 162.050-37.

(8) For each cargo monitor, a statement of whether it is to be used with crude oils, refined products, or both.

(9) A list of the substances used in operating the item that require certification under Part 147 of this chapter as articles of ships' stores and supplies.

(10) The name of the facility to conduct approval testing.

(11) If the applicant intends to use a test rig other than a test rig of the facility, a detailed description of the rig.

(b) An applicant may incorporate by reference in his application information that he has submitted in a previous application.

§ 162.050-7 Approval procedures.

(a) An application for approval of equipment under this subpart must be sent to the Commandant (G-MMT-3/83), U.S. Coast Guard, Washington, D.C. 20590.

(b) The application is examined by the Coast Guard to determine whether the item complies with the design requirements and vibration standard prescribed in this subpart and to determine what probability the item has of passing the approval tests. The applicant is notified of the results of the examination.

(c) If examination of the application reveals that it is incomplete, it is returned to the applicant with a statement of reasons why it is incomplete.

(d) The applicant must make arrangements for approval testing directly with a testing facility and must provide the facility with a copy of the instructions manual for the equipment to be tested.

(e) If applications for approval of a separator have been made for more than one size, the applicant, in lieu of submitting each size for approval testing, may submit each size that has a capacity exceeding fifty (50) cubic meters per hour throughput, if any, and two additional sizes that have a capacity of fifty (50) cubic meters per hour throughput or less. One of the additional sizes must have a capacity that is in the highest quartile of capacities manufactured in the 0-50 cubic meters per hour throughput range and the other must be from the lowest quartile.

(f) Each approval test must be performed by a facility designated under § 162.050-15. The facility must perform each test in accordance with the test conditions prescribed in this subpart for the test, prepare a test report for the item if it completes all of the tests, and send the report with four copies to the Commandant (G-MMT). The applicant may observe the tests. (If an item does not complete testing, a new application must be made before retesting.)

(g) The Commandant (G-MMT), sends a copy of the test report to the applicant and advises him whether the item is approved. If the item is approved, an approval certificate is sent to the applicant. The approval certificate lists conditions of approval applicable to the item.

(h) A separator is approved under this subpart if—

(1) It meets the design requirements in § 162.050-21 and is tested in accordance with this subpart;

(2) In the case of a 100 p.p.m. separator, the oil content of each sample of separated water effluent taken during approval testing is 100 p.p.m. or less;

(3) In the case of a 15 p.p.m. separator, the oil content of each sample of separated water effluent taken during approval testing is 15 p.p.m. or less;

(4) During Test No. 3S an oily mixture is not observed at the separated water outlet of the separator;

(5) During Test No. 5S its operation is continuous; and

(6) Any substance used in operating the separator that requires certification under Part 147 of this chapter as an article of ships' stores or supplies has been certified.

(i) A cargo monitor is approved under this subpart if—

(1) It meets the design requirements in § 162.050-25 and is tested in accordance with this subpart;

(2) Each oil content reading recorded during approval testing is within ±10 p.p.m. or ±20 percent of the oil content of the sample of influent mixture taken at the time of the reading;

(3) Its response time is twenty (20) seconds or less in Test No. 3CM;

(4) The time intervals between successive readings recorded in Test No. 4CM are twenty (20) seconds or less; and

(5) Any substance used in operating the monitor that requires certification under Part 147 of this chapter as an article of ships' stores or supplies has been certified.

(j) A bilge monitor is approved under this subpart if—

(1) It meets the design requirements in § 162.050-29 and is tested in accordance with this subpart;

(2) Except as provided in paragraph (j)(5) of this section, each oil content reading recorded during approval testing is within ±10 p.p.m. or ±20 percent of the oil content of the sample of influent mixture taken at the time of the reading;

(3) The time intervals between successive readings recorded in Test No. 3BM are twenty (20) seconds or less;

(4) The time intervals between successive readings recorded in Test No. 4BM are twenty (20) seconds or less;

(5) The oil content of the sample taken each time the device required by § 162.050-29(c)(1) actuates is 15 p.p.m. ±5 p.p.m.;

(6) The oil content of the sample taken each time the device required by § 162.050-29(c)(2) actuates is 100 p.p.m. ±20 p.p.m.; and

(7) Any substance used in operating the monitor that requires certification under Part 147 of this chapter as an article of ships' stores or supplies has been certified.

(k) A bilge alarm is approved under this subpart if—

(1) It meets the design requirements in § 162.050-33 and is tested in accordance with this subpart;

(2) The oil content of each sample taken during approval testing is 15 p.p.m. ±5 p.p.m.;

(3) Its response time is twenty seconds or less in Test No. 2A; and

(4) Any substance used in operating the alarm that requires certification under Part 147 of this chapter as an article of ships' stores or supplies has been certified.

§ 162.050-9 Test report.

(a) A report of approval testing must contain the following:

(1) Name of the testing facility.

(2) Name of the applicant.

(3) Date of receiving the item for testing and the dates of the tests conducted.

(4) Trade name and brief description of the item.

(5) A listing of the following properties of the test oils used:

(i) Relative density at 15°C.

(ii) Viscosity in centistokes at 37.8°C.

(iii) Flashpoint.

(iv) Weight of ash content.

(v) Weight of water content.

(vi) Relative density at 15°C. the of water used during testing and the weight of solid content in the water.

(vii) The data recorded during each test.

§ 162.050-11 Marking.

(a) Each separator, monitor, and bilge alarm manufactured under Coast Guard approval must be plainly marked by the manufacturer with the information listed in paragraph (b) of this section. The marking must be securely fastened to the item.

(b) Each marking must include the following information:

(1) Name of the manufacturer.

(2) Name or model number of the item.

(3) If the item is a separator, the maximum throughput and the maximum influent pressure at which the separator is designed to operate.

(4) The month and year of completion of manufacture.

(5) The manufacturer's serial number for the item.

(6) The Coast Guard approval number assigned to the item in the certificate of approval.

(7) A list of bilge cleaners, solvents, and other chemical compounds that do not impair operation of the item.

(8) If the item is a cargo monitor, the oils for which use has been approved.

(9) If the item is a separator that uses replaceable filter or coalescer elements, the part numbers of the elements.

§ 162.050-13 Factory production and inspection.

(a) Equipment manufactured under Coast Guard approval must be of the type described in the current certificate of approval issued for the equipment.

(b) Equipment manufactured under Coast Guard approval is not inspected on a regular schedule at the place of manufacture. However, the Commandant may detail Coast Guard personnel at any time to visit a factory where the equipment is manufactured to conduct an inspection of the manufacturing process.

§ 162.050-14 Sample collection and preservation.

(a) Each sample obtained in approval testing must be approximately one (1) liter in volume and must be collected in a narrow-necked glass bottle that has a pressure sealing cap. The cap must be lined with a material that will not affect the oil content of the sample.

(b) Each sample must be preserved by the addition of 5 ml. of hydrochloric acid at the time of collection. The hydrochloric acid must consist of equal amounts of concentrated reagent grade hydrochloric acid and distilled water.

(c) Each sample must be refrigerated at or below 4°C until analyzed. However, refrigeration is not necessary if there is no time delay between sample collection and analysis.

§ 162.050–15 Designation of facilities.

(a) Each request for designation as a facility authorized to perform approval tests must be submitted to the Commandant (G-MMT-3/83), U.S. Coast Guard, Washington, D.C. 20590.

(b) Each request must include the following:

(1) Name and address of the facility.

(2) Each type of equipment the facility proposes to test.

(3) A description of the facility's capability to perform approval tests including detailed information on the following:

(i) Management organization including personnel qualifications.

(ii) Equipment available for conducting sample analysis.

(iii) Materials available for approval testing.

(iv) Each of the facility's test rigs, if any.

(c) The Coast Guard reviews each request submitted to determine whether the facility meets the requirements of paragraphs (g)(1) through (g)(4) of this section.

(d) If the facility meets the requirements in paragraphs (g)(1) through (g)(4) of this section, it is then supplied with twelve samples containing mixtures of oil in water that are within a 10 to 30 p.p.m. range.

(e) The facility must measure the oil content of each sample using the method described in § 162.050–39 and report the value of each of the 12 measurements to the Commandant (G-MMT-3/83), U.S. Coast Guard, Washington, D.C. 20590.

(f) The measurements must meet the following criteria:

(1) Except as provided in paragraph (f)(2) of this section, the absolute value of Tn for each measurement, as determined by the method described in paragraph 10.3.2 of the American Society for Testing and Materials, "Standard Practice for Determination of Precision and Bias of Methods of Committee D-19 on Water", D-2777-77, must be less than or equal to 2.29 at a confidence level of 0.05.

(2) The absolute value of Tn for one measurement may exceed 2.29 if the Tn values for the other eleven measurements are less than or equal to 2.23 at a confidence level of 0.05. If the Tn value for one measurement exceeds 2.29, that measurement is not used in the method described in paragraph (f)(3) of this section.

(3) The value of $\bar{X}$ for the 12 measurements described in paragraph (e) of this section, or for 11 measurements if paragraph (f)(2) of this section applies, must be within the range of -1 $\bar{X}d$ $+1$ at a minimum confidence level of 0.01 when $\bar{X}d$ is determined by the method described in paragraph 3-3.1.4 of "Experimental Statistics", National Bureau of Standards Handbook No. 91 (October 1966).

(g) To obtain authorization to conduct approval tests—

(1) A facility must have the management organization, equipment for conducting sample analysis, and the materials necessary to perform the tests;

(2) Each facility test rig must be of a type described in § 162.050–17 or § 162.050–19;

(3) The loss or award of a specific contract to test equipment must not be a substantial factor in the facility's financial well being;

(4) The facility must be free of influence and control of the manufacturers, suppliers, and vendors of the equipment; and

(5) The oil content measurements submitted to the Commandant must meet the criteria in paragraph (f) of this section.

(h) A facility may not subcontract for approval testing unless previously authorized by the Coast Guard. A request for authorization to subcontract must be sent to the Commandant (G-MMT-3/83), U.S. Coast Guard, Washington, D.C. 20590.

§ 162.050–17 Separator test rig.

(a) This section contains requirements for test rigs used in approval testing of separators. A diagram of a typical test rig is shown in Figure 162.050-17(a).

(b) Each mixture pump on a test rig must—

(1) Be a centrifugal pump capable of operating at one thousand (1,000) revolutions per minute or more;

(2) Have a delivery capacity of at least one and one half (1.5) times the maximum throughput at which the separator being tested is designed to operate;

(3) Have a maximum delivery pressure that is equal to or greater than the maximum influent pressure at which the separator is designed to operate; and

(4) Have either bypass piping to its suction side or a throttle valve or orifice on its discharge side.

(c) The inlet piping of the test rig must be sized so that—

(1) Influent water flows at a Reynolds Number of at least ten thousand;

(2) The influent flow rate is between one and three meters per second; and

(3) Its length is at least twenty (20) times its inside diameter.

(d) Each sample point on a test rig must meet the design requirements described in Figure 162.050-17(e) and must be in a vertical portion of the test rig piping.

§ 162.050-19 Monitor and bilge alarm test rig.

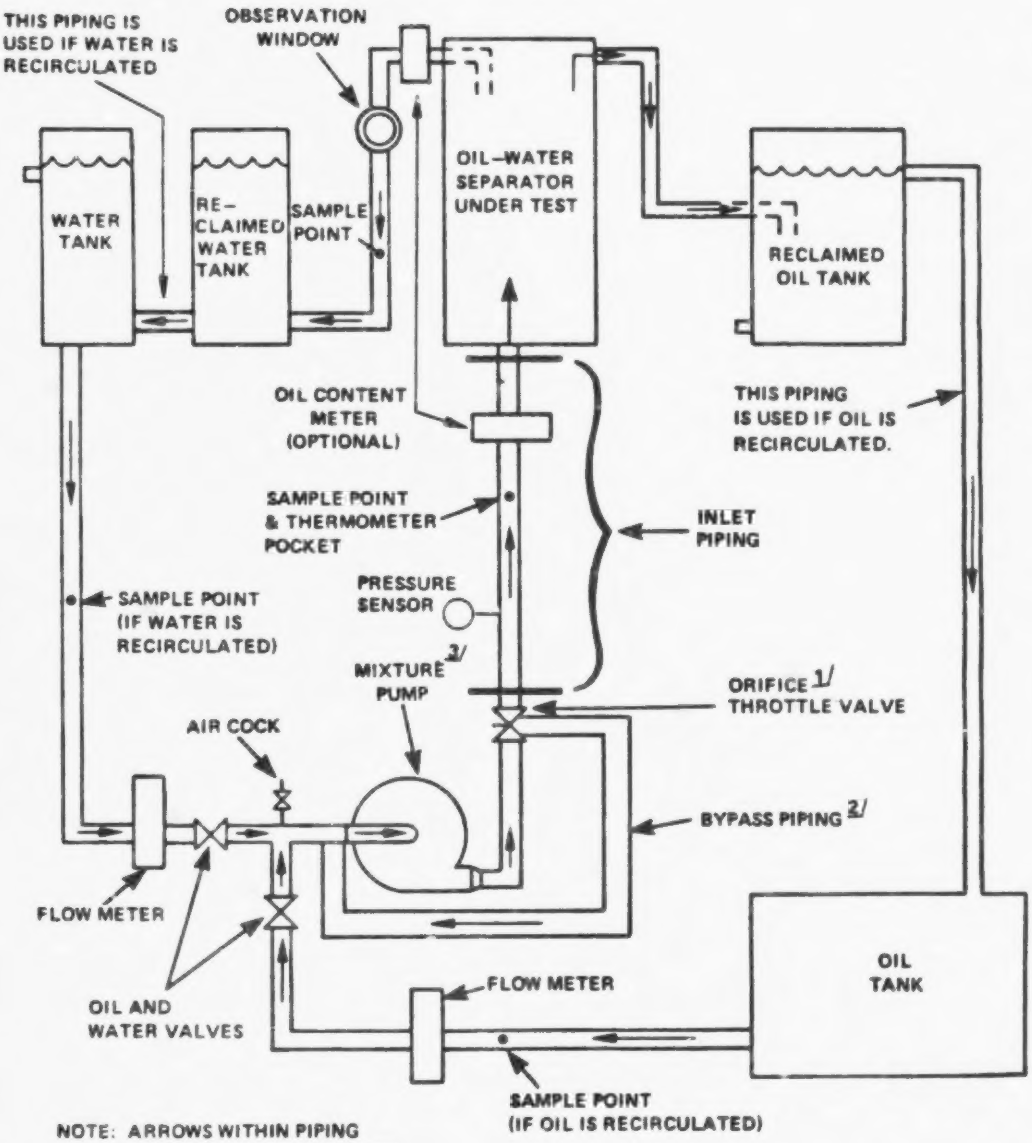
(a) This section contains requirements for test rigs used in approval testing of monitors and bilge alarms. A typical test rig is described in Figure 162.050-19. The mixture pipe shown in Figure 162.050-19 is the portion of test rig piping between the oil injection point and the monitor or bilge alarm piping.

(b) Each sample point on a test rig must be of the type described in Figure 162.050-17(e) and must be in a vertical portion of the test rig piping.

(c) Each test rig must have a centrifugal pump that is designed to operate at one thousand (1,000) revolutions per minute or more.

(d) The mixture pipe on a test rig must have a uniform inside diameter.

FIGURE 162,050—17(a) - SEPARATOR TEST RIG


THIS PIPING IS USED IF WATER IS RECIRCULATED
OBSERVATION WINDOW
WATER TANK
RE-CLAIMED WATER TANK
SAMPLE POINT
OIL-WATER SEPARATOR UNDER TEST
RECLAIMED OIL TANK
OIL CONTENT METER (OPTIONAL)
THIS PIPING IS USED IF OIL IS RECIRCULATED.
SAMPLE POINT & THERMOMETER POCKET
INLET PIPING
PRESSURE SENSOR
SAMPLE POINT (IF WATER IS RECIRCULATED)
MIXTURE PUMP 3/
ORIFICE 1/ THROTTLE VALVE
AIR COCK
BYPASS PIPING 2/
FLOW METER
OIL AND WATER VALVES
FLOW METER
OIL TANK
SAMPLE POINT (IF OIL IS RECIRCULATED)

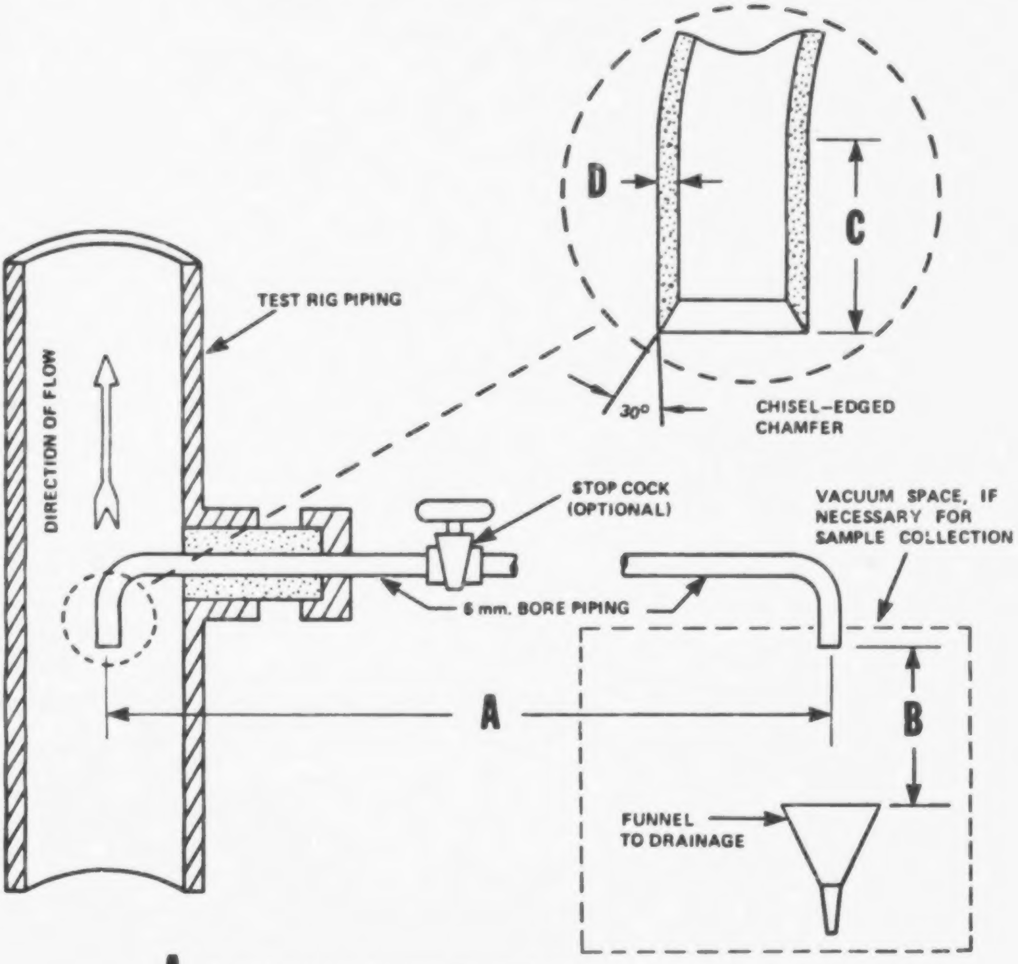
NOTE: ARROWS WITHIN PIPING SHOW DIRECTION OF FLOW.

[1] NOT REQUIRED IF MIXTURE PUMP HAS BYPASS PIPING. SEE § 162.050–17(b) (4)

[2] NOT REQUIRED IF MIXTURE PUMP PIPING HAS ORIFICE. SEE § 162.050–17(b)(4)

[3] NOT REQUIRED IF SEPARATOR HAS SUPPLY PUMP. SEE § 162.050–17(b)

FIGURE 162,050–17(e) - SAMPLE POINT


D
C
TEST RIG PIPING
DIRECTION OF FLOW
30°
CHISEL–EDGED CHAMFER
STOP COCK (OPTIONAL)
VACUUM SPACE, IF NECESSARY FOR SAMPLE COLLECTION
6 mm. BORE PIPING
A
B
FUNNEL TO DRAINAGE

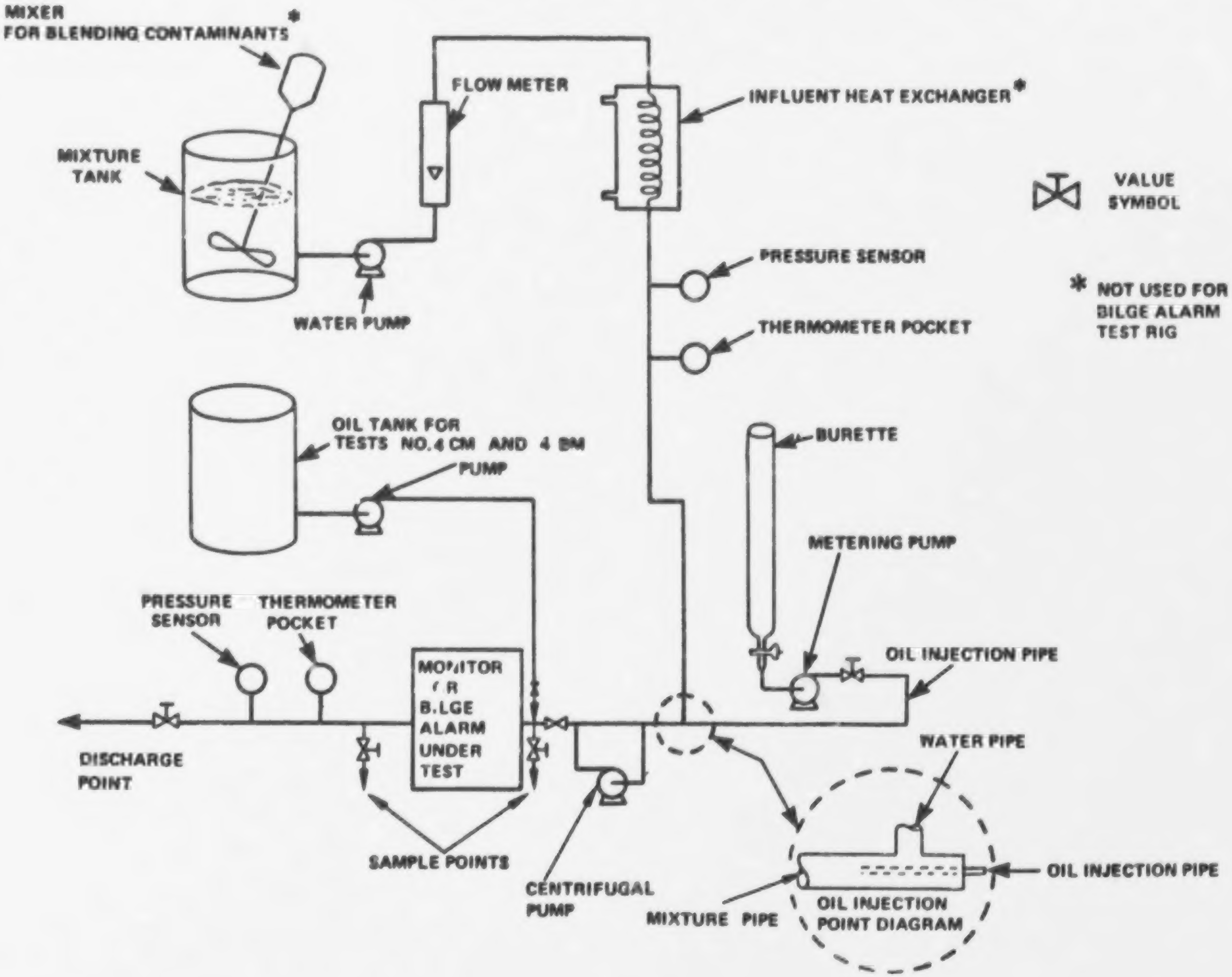
A dimension A is not greater than 400 mm.

B height B is large enough to insert a sample bottle.

C distance C is a straight line of not less than 60 mm.

D width D is not greater than 2 mm.

FIGURE 162,050—19 - MONITOR AND BILGE ALARM TEST RIG


MIXER
FOR BLENDING CONTAMINANTS*
MIXTURE TANK
WATER PUMP
FLOW METER
INFLUENT HEAT EXCHANGER*
VALUE SYMBOL
PRESSURE SENSOR
THERMOMETER POCKET
* NOT USED FOR BILGE ALARM TEST RIG
OIL TANK FOR TESTS NO. 4 CM AND 4 BM
PUMP
BURETTE
METERING PUMP
PRESSURE SENSOR
THERMOMETER POCKET
MONITOR OR BILGE ALARM UNDER TEST
OIL INJECTION PIPE
DISCHARGE POINT
WATER PIPE
SAMPLE POINTS
CENTRIFUGAL PUMP
MIXTURE PIPE
OIL INJECTION POINT DIAGRAM
OIL INJECTION PIPE

§ 162.050-21 Separator: Design specification.

(a) A separator must be designed to operate in each plane that forms an angle of 22.5° with the plane of its normal operating position.

(b) The electrical components of a separator that are to be installed in an explosive atmosphere must be approved by an independent laboratory as components that Underwriters Laboratories Standard 913 (dated April 8, 1976) defines as intrinsically safe for use in a Class I, Group D hazardous location.

(c) Each separator component that is a moving part must be designed so that its movement during operation of the separator does not cause formation of static electricity.

(d) Each separator must be designed in accordance with the applicable requirements in Subchapters F and J of this chapter.

(e) Each separator must be designed to be operated both automatically and manually. Each separator to be installed in an unattended machinery space must be capable of operating automatically for at least twenty-four (24) hours.

(f) Each separator must be designed so that adjustments to valves or other equipment are not necessary to start it.

(g) Each part of a separator that is susceptible to wear and tear must be readily accessible for maintenance in its installed position.

(h) A separator must be designed so that it does not rely in whole or in part on dilution of influent mixtures as a means of performing its function.

§ 162.050-23 Separator: Approval tests.

(a) *Test Conditions.* (1) Each test described in this section must be performed at a throughput and influent pressure equal to the maximum throughput and pressure at which the separator being tested is designed to operate. The tests and each of the steps in the tests must be carried out in the order described in this section. Each test must be performed without time delay between steps in the test.

(2) Except as provided in Test No. 6S, the influent oil used in each test must be a heavy fuel oil that has a relative density of approximately 0.94 at 15°C and a viscosity of at least 220 centistokes (approximately 900 seconds Redwood No. 1) at 37.8°C.

(3) A test rig of the type described in § 162.050-17 must be used in performing each test.

(4) If a separator has a supply pump, it must be tested using that pump. If a separator does not have a supply pump, it must be tested using the mixture pump on the test rig.

(5) The influent water used in each test must be clean fresh water or clean fresh water in solution with sodium chloride. The water or solution must have a relative density at 15°C that is equal to or less than 0.085 plus the relative density of the heavy fuel oil used in the tests.

(6) Each test must be conducted at an ambient temperature of between 10°C and 30°C.

(7) The oil content of each sample must be measured using the method described in § 162.050-39.

(8) Influent oil content must be determined during testing by measuring the flow rates of the oil and water that are mixed to form the influent or by use of an oil content meter on the inlet piping of the test rig. If an oil content meter is used, a sample of influent and a meter reading must be taken at the beginning of each test. If the meter reading is not within ±10 percent of the oil content of the sample, the meter readings subsequently taken during the test are unacceptable test results.

(9) When collecting a sample at a sample point that has a stop cock, the first minute of fluid flow through the stop cock must not be included in the sample collected.

(10) In each test, the separator must be operated in accordance with the procedures described in its instruction manual.

(11) No maintenance, including replacement of parts, may be performed on a separator during or between the tests described in this section.

(12) A one (1) liter sample of each oil to be used in testing must be taken and provided for use in the sample analysis required by § 162.050-39.

(13) The separator may not be operated manually in Test No. 5S.

(b) *Test No. 1S.* The separator is filled with water and started. It is fed with oil for at least five (5) minutes and then with an oil-water influent containing an oil content of between 5,000 and 10,000 p.p.m. until a steady flow rate occurs. After the flow rate is steady, the influent is fed to the separator for thirty (30) minutes. Samples of separated water effluent are taken after the first ten (10) and twenty (20) minutes. At the end of the thirty (30) minute period, the air cock on the test rig is opened and, if necessary, the oil and water supply valves are closed to stop the flow of influent. A sample is then taken of the separated water effluent as the effluent flow ceases.

(c) *Test No. 2S.* Test No. 1S is repeated using an influent containing approximately 25 percent oil and 75 percent water.

(d) *Test No. 3S.* The separator is fed with oil until oil is discharged at the oil discharge outlet of the separator at essentially the same rate that oil is being fed to the separator. The separator is then fed with oil for five (5) additional minutes. If any oily mixture is discharged from the separated water outlet on the separator during the test, that observation is recorded.

(e) *Test No. 4S.* The separator is fed with water for fifteen (15) minutes. Samples of the separated water effluent are taken at the beginning of the test and after the first ten (10) minutes.

(f) *Test No. 5S.* The separator is operated automatically for three (3) hours. During the test, the separator is continuously fed with an influent varying from water to a mixture of 25 percent oil in water and back to water every fifteen (15) minutes. The oil concentration in the influent is varied in at least five (5) equal increments during each fifteen (15) minute period and the time intervals between the incremental changes are equal. During the last hour, the separator must be inclined at an angle of 22.5° with the plane of its normal operating position. During the last time increment in which the unit is fed a 25 percent oil mixture, a sample of the separated water effluent is taken. If the separator stops at any time during this test, that observation is recorded.

(g) *Test No. 6S.* Tests No. 1S and No. 2S are repeated using, in lieu of a heavy fuel oil in the influent, a light distillate fuel oil having a relative density of approximately 0.83 at 15°C.

§ 162.050–25 Cargo monitor: Design specification.

(a) This section contains requirements that apply to cargo monitors.

(b) Each monitor must be designed so that it is calibrated by a means that does not involve manually mixing a known quantity of oil and a known quantity of water to form a mixture and manually feeding the mixture into the monitor.

(c) The electrical components of a monitor that are to be installed in an explosive atmosphere must be approved by an independent laboratory as components that Underwriters Laboratories Standard 913 (dated April 8, 1976) defines as intrinsically safe for use in a Class I, Group D hazardous location.

(d) Each monitor component that is a moving part must be designed so that its movement during operation of the monitor does not cause formation of static electricity.

(e) A monitor must be designed to operate in each plane that forms an angle of 22.5° with the plane of its normal operating position.

(f) Each monitor must be designed in accordance with the applicable requirements contained in Subchapters F and J of this chapter.

(g) Each monitor must be designed so that it records each change in oil content of the mixture it is measuring within twenty (20) seconds after the change occurs.

(h) Each monitor must have a device that produces a warning signal and a signal that can be used to actuate valves in a vessel's fixed piping system, when—

(1) The oil content of the mixture being measured exceeds the concentration limit set by the operator of the monitor; and

(2) Malfunction, breakdown, or other failure of the monitor occurs.

(i) Each monitor must have a means to determine whether it is accurately calibrated.

(j) Each monitor must have a device that is designed to record continuously the amount of oil (in liters) in any cargo residue, and any other oily mixture combined with a cargo residue, discharged overboard from the vessel on which the monitor is installed. The device must also have a means to record the amount of oil in the discharge per nautical mile of vessel travel and the date and time of discharge. The record must be durable enough to be kept for three (3) years. If the device has more than one scale, it must have a means to show on the record the scale in use at the time of the reading.

§ 162.050-27 Cargo monitor: Approval tests.

(a) This section contains requirements that apply to cargo monitors.

(b) *Test conditions.* (1) The tests and each step in the tests must be carried out in the order described in this section. Each test must be performed without time delay between steps in the test.

(2) A test rig of the type described in § 162.050-19 must be used in performing each test.

(3) Each mixture used during the tests must be prepared by combining oil supplied from the oil injection pipe of the test rig and water supplied from the mixture tank of the test rig. However, if the flow of oil through the oil injection pipe becomes intermittent, oil and water may be combined in the mixture tank to form the mixture.

(4) A mixture may be circulated through a monitor only once during testing.

(5) Unless otherwise provided in a specific test, the water used in each test must be clean, fresh water.

(6) The oil used in each test, except Test No. 2CM, must be Arabian light crude oil.

(7) Each test must be performed at an ambient temperature of between 10° C and 30° C.

(8) Unless otherwise provided in a specific test, each test must be performed at the maximum mixture pressure, the maximum flow rate, and the power supply ratings at which the monitor is designed to operate.

(9) The particulate contaminant described in Table 162.050-27(g) must be of a type that does not lose more than three (3) percent of its weight after ignition and must be insoluble in a 500 p.p.m. mixture.

(10) In each test the monitor must be operated in accordance with the procedures described in its instructions manual.

(11) Unless otherwise provided in a specific test, the centrifugal pump shown in Figure 162.050-19 must be operated at one thousand (1,000) revolutions per minute or more in each test.

(12) Whenever the oil content of a mixture is recorded, a sample of the mixture must also be taken. The oil content of the sample must be measured using the method described in § 162.050-39.

(13) A one (1) liter sample of each oil to be used in testing must be taken and provided for use in the sample analysis required by § 162.050-39.

(c) *Test No. 1CM.* The cargo monitor is calibrated and zeroed. It is then fed with water for 15 minutes and then with mixtures in the following concentrations: 15 p.p.m., 50 p.p.m., 100 p.p.m., and each additional concentration, in increments of 50 p.p.m. up to the highest oil concentration that can be read on the monitor. Each mixture is fed to the monitor in the order listed for fifteen (15) minutes. Water is fed to the monitor for a (15) minute period between each mixture. At the end of each (15) minute period, an oil content reading is obtained and recorded.

(d) *Test No. 2CM.* (1) If the cargo monitor is designed for use with crude oils, it is fed with a mixture of water and the first oil listed in Table 162.050-27(d) at the following concentrations: 15 p.p.m., 100 p.p.m., and a concentration that is ninety (90) percent of the highest oil concentration in water that can be read on the monitor. Each concentration is fed to the monitor in the order listed until a steady reading occurs and is recorded. After each steady reading is recorded, the monitor is fed with water for fifteen (15) minutes. At the end of each fifteen (15) minute period of feeding the monitor with water, an oil content reading is again obtained and recorded.

(2) The steps described in paragraph (d)(1) of this section are repeating using each of the other oils listed in Table 162.050-27(d).

TABLE 162.050-27(D).—*Oil Type and Characteristics*

Oil type	Characteristics
1. Sahara blend crude oil	Density—low. Viscosity—low. Pour point—very low. Producing country—Algeria. General description—mixed base.
2. Arabian light crude oil	Density—medium. Viscosity—medium. Pour point—low. Producing country—Saudi Arabia. General description—mixed base.
3. Nigerian medium crude oil.	Density—high. Viscosity—medium. Pour point—low. Producing country—Nigeria. General description—naphthenic base.
4. Bachaquero 17 crude oil	Density—very high. Viscosity—very high. Pour point—low. Producing country—Venezuela. General description—asphaltic base.
5. Minas crude oil	Density—medium. Viscosity—high. Pour point—very high. Producing country—Indonesia. General description—paraffinic base.
6. Residual fuel oil	Bunker C or No. 6 Fuel Oil.

(3) If any oil listed in Table 162.050-27(d) is unavailable, an oil with similar properties may be substituted in testing.

(4) If the monitor is to be used with refined oil products, the steps described in paragraph (d)(1) of this section are performed using each of the following:

(i) Leaded regular grade automotive gasoline.

(ii) Unleaded automotive gasoline.

(iii) Kerosene.

(iv) Light diesel or No. 2 fuel oil.

(e) *Test No. 3CM.* (1) The cargo monitor is fed with water, zeroed, and then fed with a 100 p.p.m. mixture. The time at which the monitor first detects oil in the mixture, the times of reading 63 p.p.m. and 90 p.p.m., and the time of reaching the highest steady reading of oil content are recorded. The oil content of the mixture at the highest steady reading is also recorded.

(2) The metering pump is turned off and the time at which the highest reading starts to decrease, the times of reading 37 p.p.m. and 10 p.p.m., and the time of returning to the lowest steady oil content reading are recorded. The oil content of the mixture at the lowest steady reading is also recorded.

(3) The time interval between first detecting oil in the mixture and reading 63 p.p.m., and the time interval between the first decrease in the highest reading and reading 37 p.p.m., are averaged and recorded as the response time for the monitor.

(f) *Test No. 4CM.* (1) The cargo monitor is fed with water, zeroed, and then fed with a mixture containing ten (10) percent oil for one (1) minute. The following times occurring during this procedure are recorded:

(i) Time at which the monitor first detects oil.

(ii) Time of reading 100 p.p.m.

(iii) Time of exceeding the highest oil concentration that can be read on the monitor.

(iv) Time of returning to the highest oil concentration that can be read on the monitor.

(v) Time of returning to a reading of 100 p.p.m.

(vi) Time of returning to the lowest steady oil content reading.

(2) The oil content of the mixture at the lowest steady reading described in paragraph (f)(1)(vi) of this section is recorded.

(3) The monitor is fed with water, zeroed, and then fed with oil for one (1) minute after which the flow of water is resumed. The times described in paragraph (f)(1) of this section are recorded.

(4) The monitor is fed with a 100 p.p.m. mixutre until a steady oil content reading is obtained and recorded.

(g) *Test No. 5CM.* (1) The cargo monitor is fed with a 500 p.p.m. mixture until a steady reading is obtained and recorded.

(2) The monitor is fed with a 500 p.p.m. mixture to which enough

sodium chloride has been added to provide a concentration of 60,000 parts per million of sodium chloride in water. The oil content reading, when steady, is recorded.

(3) The monitor is fed with a 500 p.p.m. mixture to which enough of the contaminant described in Table 162.050-27(g) has been added to provide a concentration of 100 parts per million of particulate contaminant in water. The oil content reading, when steady, is recorded.

Table 162.050-27(g).—*Insoluble Particulate Contaminant; Physical Description*

Particle sizes, microns:	*Percentage* [1]
0-5	39±2
5-10	18±3
10-20	16±3
20-40	18±3
40-80	9±3

[1] By weight of particle size in contaminant.

(h) *Test No. 6CM.* (1) The cargo monitor is fed with a 100 p.p.m. mixture until a steady oil content reading is obtained and recorded.

(2) The monitor is fed with a 100 p.p.m. mixture that has first passed through the centrifugal pump of the test rig. The pump is run at one fourth (¼) of its design speed. The oil content reading, when steady, is recorded.

(3) The steps described in paragraph (h)(2) of this section are repeated with the pump running at one-half (½) of its design speed and then repeated at its design speed.

(i) *Test No. 7CM.* (1) The steps described in paragraph (h)(1) of this section are repeated.

(2) The temperature of the mixture is adjusted to 10°C and the flow continued until a steady oil content reading is obtained and recorded.

(3) The steps described in paragraph (i)(2) of this section are repeated with the temperature of the mixture at 65°C or the highest mixture temperature at which the cargo monitor is designed to operate, whichever is lower.

(j) *Test No. 8CM.* (1) The steps described in paragraph (h)(1) of this section are repeated.

(2) If the monitor has a positive displacement mixture pump, the mixture pressure is lowered to one half of the monitor's maximum design pressure. If the monitor has a centrifugal mixture pump, or is not equipped with a mixture pump, the mixture flow rate is reduced to one-half of the monitor's design flow rate. The reduced flow rate or mixture pressure is maintained until a steady oil content reading is obtained and recorded.

(3) If the monitor has a positive displacement mixture pump, the mixture pressure is increased to twice the monitor's design pressure. If the monitor has a centrifugal mixture pump or does not have a mixture pump, the mixture flow rate is increased to twice the monitor's maximum design flow rate. The increased flow rate or mixture pressure is maintained until a steady oil content reading is obtained and recorded.

(k) *Test No. 9CM.* (1) The steps described in paragraph (h)(1) of this section are repeated.

(2) The water and metering pumps on the test rig are stopped for eight (8) hours after which the steps described in paragraph (h)(1) of this section are repeated.

(l) *Test No. 10CM.* (1) The supply voltage to the cargo monitor is increased to one hundred and ten (110) percent of its design supply voltage. The monitor is then fed a 100 p.p.m. mixture for one (1) hour. At the end of the one (1) hour period, an oil content reading is obtained and recorded.

(2) The steps described in paragraph (l)(1) of this section are repeated with the supply voltage to the monitor lowered to ninety (90) percent of its design supply voltage.

(3) Upon completing the steps described in paragraph (l)(2) of this section, the supply voltage to the monitor is returned to the design rating.

(4) The steps described in paragraph (l)(1), (l)(2), and (l)(3) of this section are repeated varying each other power supply to the monitor in the manner prescribed in those steps for supply voltage.

(m) *Test No. 11CM.* (1) The monitor is calibrated and zeroed.

(2) The steps described in paragraph (h)(1) of this section are repeated.

(3) A 100 p.p.m. mixture is fed to the monitor for eight (8) hours. At the end of the eight (8) hour period, an oil content reading is obtained and recorded.

(4) The monitor is fed with water until a steady oil content reading is obtained and recorded.

(n) *Test No. 12CM.* (1) All power to the monitor is shut off for one (1) week. After one week the monitor is started, zeroed, and calibrated.

(2) The monitor is fed with a 100 p.p.m. mixture for one (1) hour. An oil content reading is then obtained and recorded.

(3) The monitor is fed with water for one (1) hour. An oil content reading is then obtained and recorded.

(4) The steps described in paragraphs (n)(2) and (n)(3) of this section are repeated three (3) additional times. During the last hour in which the monitor is fed with a 100 p.p.m. mixture, the monitor is inclined at an angle of 22.5° with the plane of its normal operating position.

§ 162.050–29 Bilge monitor: Design specification.

(a) This section contains requirements that apply to bilge monitors.

(b) Each bilge monitor must be designed to meet the requirements of this section and the requirements for a cargo monitor in §§ 162.050-25 (b) through (g) and § 162.050-25(i).

(c) Each bilge monitor must have—

(1) A device that produces a warning signal, and a signal that can be used to actuate stop valves in a vessel's fixed piping system, when the oil content of the mixture being measured exceeds 15 p.p.m. ±5 p.p.m.;

(2) A device that produces a warning signal, and a signal that can be used to actuate stop valves in a vessel's fixed piping system, when the oil content of the mixture being measured exceeds 100 p.p.m. ±20 p.p.m.; and

(3) A device that produces a warning signal, and a signal that can be used to actuate stop valves in a vessel's fixed piping system, when malfunction, breakdown, or other failure of the bilge monitor occurs.

(d) Each bilge monitor must have a device that is designed to record continuously the concentration of oil in p.p.m. that the monitor measures and to record the date and time of the measurements. The record must be durable enough to be kept for three (3) years. If the device has more than one scale, it must have a means to show on the record the scale in use at the time of the reading.

§ 162.050–31 Bilge monitor: Approval tests.

(a) This section contains requirements that apply to bilge monitors.

(b) *Test conditions.* (1) Each test must be conducted under the conditions prescribed in this section and under the conditions prescribed for cargo monitors in §§ 162.050-27 (b)(1) through (b)(4) and §§ 162.050-27 (b)(7) through (b)(13).

(2) Except as provided in Test No. 2BM, the oil used in each test must be a heavy fuel oil that has a relative density of approximately 0.94 at 15°C and a viscosity of at least 220 centistokes (approximately 900 seconds Redwood No. 1) at 37.8°C.

(3) The water used in each test must be clean fresh water or clean fresh water in solution with sodium chloride. The water must have a relative density at 15°C that is equal to or less than 0.085 plus the relative density of the heavy fuel oil used in the tests.

(c) *Test No. 1BM.* (1) The bilge monitor is calibrated and zeroed. It is then fed with water for 15 minutes and then with mixtures in the following concentrations: 15 p.p.m., 50 p.p.m., 75 p.p.m., 100 p.p.m., and each additional concentration, in increments of 25 p.p.m. up to the highest oil concentration that can be read on the monitor. Each concentration is fed to the monitor in the order listed for fifteen (15) minutes. Water is fed to the monitor for fifteen (15) minutes between each mixture. At the end of each fifteen (15) minute period an oil content reading is obtained and recorded.

(2) The metering and water pumps of the test rig are started and the oil content of the mixture is increased until the device required by § 162.050-29(c)(1) actuates. The oil content of the mixture causing actuation is recorded.

(3) The oil content of the mixture is then increased until the device required by § 162.050-29(c)(2) actuates. The oil content of the mixture causing actuation is recorded.

(d) *Test No. 2BM.* Test No. 1BM is repeated using, in lieu of a heavy fuel oil in the mixture, a light distillate fuel oil having a relative density of approximately 0.83 at 15°C.

(e) *Test No. 3BM.* (1) The bilge monitor is fed with water, zeroed, and then fed with a 15 p.p.m. mixture until a steady reading is obtained and recorded. The time of first detecting oil in the mixture and the time of reaching the highest steady reading of oil content are also recorded. The metering pump is turned off after the highest steady reading is obtained. The time at which the highest steady reading starts to decrease and the time of returning to the lowest steady oil content reading are recorded. The oil content of the lowest steady reading is also recorded.

(2) The steps in paragraph (l) of this section are repeated using a 100 p.p.m. mixture.

(f) *Test No. 4BM.* (1) The bilge monitor is fed with water, zeroed, and then fed with a mixture containing (10) percent oil for one (1) minute. The following times occurring during this procedure are recorded:

(i) Time at which the monitor first detects oil.

(ii) Time of actuation of the device required by § 162.050-29(c)(1).

(iii) Time of actuation of the device required by § 162.050-29(c)(2).

(iv) Time of exceeding the highest oil concentration that can be read on the monitor.

(v) Time of returning to the highest oil concentration that can be read on the monitor.

(vi) Time of returning to the lowest steady oil content reading.

(2) The oil content of the mixture at the lowest steady reading described in paragraph (f)(1)(vi) of this section is recorded.

(3) The monitor is fed with water, zeroed, and then fed with oil for one (1) minute after which the flow of water is resumed. The times described in paragraph (f)(1) of this section are recorded.

(4) The monitor is fed with a 15 p.p.m. mixture until a steady oil content reading is obtained and recorded.

(5) The monitor is fed with a 100 p.p.m. mixture until a steady oil content reading is obtained and recorded.

(g) *Test No. 5BM.* (1) The bilge monitor is fed with an 80 p.p.m. mixture until a steady reading is obtained and recorded.

(2) The monitor is fed with an 80 p.p.m. mixture to which enough sodium chloride has been added to provide a concentration of 60,000 parts per million of sodium chloride in water. The oil content reading, when steady, is recorded.

(3) The monitor is fed with an 80 p.p.m. mixture to which enough of the contaminant described in Table 162.050-27(g) has been added to provide a concentration of 20 parts per million of particulate contaiminant in water. The oil content reading, when steady, is recorded.

(h) *Test No. 6BM.* (1) The bilge monitor is fed with a 5-10 p.p.m. mixture until a steady reading is obtained and recorded.

(2) If the monitor has a positive displacement mixture pump, the mixture pressure is lowered to one half of the monitor's maximum design pressure. If the monitor has a centrifugal mixture pump or is not equipped with a mixture pump, the mixture flow rate is reduced to one half of the monitor's maximum design flow rate. After reduction of the pressure or flow rate, the oil content of the mixture is increased until the device required by § 162.050-29(c)(1) actuates. The oil content causing actuation is recorded.

(3) The monitor is fed with an 80 p.p.m. mixture until a steady reading is obtained and recorded. The oil content of the mixture is then increased until the device required by § 162.050-29(c)(2) actuates. The oil content causing actuation is recorded.

(4) If the monitor has a positive displacement mixture pump, the mixture pressure is increased to twice the monitor's maximum design pressure. If the monitor has a centrifugal mixture pump or if the monitor is not equipped with a mixture pump, the mixture flow rate is increased to twice the monitor's maximum design flow rate. After increasing the pressure or flow rate, the oil content of the mixture is increased until the device re-

quired by § 162.050-29(c)(1) actuates. The oil content causing actuation is recorded.

(5) The steps described in paragraph (h)(3) of this section are repeated.

(i) *Test No. 7BM.* (1) The steps described in paragraphs (c)(2) and (c)(3) of this section are repeated.

(2) The water and metering pumps on the test rig are stopped for eight (8) hours after which the steps described in paragraphs (c)(2) and (c)(3) of this section are repeated.

(j) *Test No. 8BM.* (1) The supply voltage to the bilge monitor is increased to one hundred and ten (110) percent of its design supply voltage. The monitor is then fed a 10 p.p.m. mixture for one (1) hour. At the end of the one (1) hour period, the oil content reading is recorded.

(2) The oil content of the mixture is increased until the device required by § 162.050-29(c)(1) actuates. The oil content causing actuation is recorded.

(3) The bilge monitor is fed with an 80 p.p.m. mixture for one (1) hour. At the end of the one (1) hour period, an oil content reading is obtained and recorded.

(4) The oil content of the mixture is increased until the device required by § 162.050-29(c)(2) actuates. The oil content causing actuation is recorded.

(5) The steps described in paragraphs (j)(1) through (j)(4) of this section are repeated with the supply voltage to the bilge monitor lowered to ninety (90) percent of its design voltage.

(6) Upon completing the steps described in paragraph (j)(5) of this section, the supply voltage to the monitor is returned to the design rating.

(7) The steps described in paragraphs (j)(1) through (j)(4) of this section are repeated varying each other power supply to the monitor in the manner prescribed in those steps for supply voltage.

(k) *Test No. 9BM.* (1) The steps described in paragraphs (c)(2) and (c)(3) of this section are repeated.

(2) An 80 p.p.m. mixture is fed to the bilge monitor for eight (8) hours. At the end of the eight (8) hour period, an oil content reading is obtained and recorded.

(3) The steps described in paragraphs (c)(2) and (c)(3) of this section are repeated.

(4) The monitor is fed with water until a steady reading is obtained and recorded.

(l) *Test No. 10BM.* (1) All power to the bilge monitor is shut off for one (1) week. After one week the monitor is started, zeroed, and calibrated.

(2) The monitor is fed with an 80 p.p.m. mixture for one (1) hour. An oil content reading is then obtained and recorded.

(3) The steps described in paragraphs (c)(2) and (c)(3) of this section are repeated.

(4) The monitor is fed with water for one (1) hour. An oil content reading is then obtained and recorded.

(5) The steps described in paragraphs (l)(2), (l)(3), and (l)(4) of this section are repeated three (3) additional times. During the last time that the step described in paragraph (l)(2) of this section is repeated, the monitor is inclined at an angle of 22.5° with the plane of its normal operating position.

§ 162.050-33 Bilge alarm: Design specification.

(a) This section contains requirements that apply to bilge alarms.

(b) Each bilge alarm must be designed to meet the requirements for a cargo monitor in §§ 162.050-25(b) through (g), § 162.050-25(i), and the requirements in this section.

(c) Each bilge alarm must have a device that produces a warning signal, and a signal that can be used to actuate stop valves in a vessel's fixed piping system, when—

(1) the oil content of the mixture being measured by the bilge alarm exceeds 15 p.p.m. ±5 p.p.m., and

(2) malfunction, breakdown, or other failure of the bilge alarm occurs.

§ 162.050-35 Bilge alarm: Approval tests.

(a) This section contains requirements that apply to bilge alarms.

(b) *Test Conditions.* (1) Each test must be conducted under the conditions prescribed for cargo monitors in §§ 162.050-27 (b)(1) through (b)(5), §§ 162.050-27 (b)(7), (b)(8), (b)(10), (b)(11), and (b)(13).

(2) Each test must be performed using a light distillate fuel oil having a relative density of approximately 0.83 at 15°C.

(3) The oil content of each sample must be measured using the method described in § 162.050-39.

(c) *Test No. 1A.* The bilge alarm is calibrated and zeroed. The metering and water pumps of the test rig are started and the oil content of the mixture is increased until the alarm actuates. A sample of the mixture causing actuation of the alarm is taken. The alarm is then fed with water for fifteen (15) minutes.

(d) *Test No. 2A.* (1) The bilge alarm is fed with a 40 p.p.m mixture until the bilge alarm actuates. The time of turning on the metering pump of the test rig and the time of alarm actuation are recorded. The flow rate on the flow meter of the test rig is also recorded.

(2) The response time of the alarm is calculated as follows:

$$\text{response time} = T_2 - \left[T_1 + \frac{(\pi)(D^2)(L)}{4Q}\right]$$

T_2 = time of alarm actuation

T_1 = time of turning on the metering pump of the test rig

D = inside diameter of the mixture pipe (cm)

L = length of the mixture pipe (cm)

Q = flow rate (cm^3/sec)

(e) *Test No. 3A.* (1) The metering and water pumps of the test rig are started and the oil content of the mixture is increased until the bilge alarm actuates. A sample of the mixture causing actuation of the alarm is taken.

(2) If the alarm has a positive displacement mixture pump, the mixture pressure is reduced to one-half (½) of the alarm's maximum design pressure. If the alarm has a centrifugal mixture pump or is not equipped with a mixture pump, the mixture flow rate is reduced to one-half (½) of the alarm's maximum design flow rate. After reduction of pressure or flow rate, the oil content in the mixture is increased until the alarm actuates. A sample of the mixture causing actuation of the alarm is taken.

(3) If the alarm has a positive displacement mixture pump, the influent pressure is increased to twice the alarm's minimum design pressure. If the alarm has a centrifugal mixture pump or if the alarm is not equipped with a mixture pump, the influent flow rate is increased to twice the alarm's maximum design flow rate. After increasing the pressure or flow rate, the oil content in the mixture is increased until the alarm actuates. A sample of the mixture causing actuation is taken.

(f) *Test No. 4A.* (1) The steps described in paragraph (e)(1) of this section are repeated.

(2) The metering and water pumps of the test rig are stopped for eight (8) hours.

(3) The metering and water pumps are started and the oil content of the mixture is increased until the bilge alarm actuates. A sample of the mixture causing actuation is taken.

(g) *Test No. 5A.* (1) The supply voltage to the bilge alarm is raised to one-hundred ten (110) percent of its design supply voltage. The oil content of the mixture is then increased until the alarm actuates. A sample of the mixture causing actuation is taken.

(2) The supply voltage to the alarm is lowered to ninety (90) percent of its design suppy voltage. The oil content of the mixture is then increased until the alarm actuates. A sample of the mixture causing actuation is taken.

(3) Upon completion of the steps described in paragraph (g)(2) of this section, the supply voltage to the alarm is returned to its design value.

(4) The steps described in paragraphs (g)(1), (g)(2), and (g)(3) of this section are repeated varying each other power supply to the alarm in the manner prescribed in those steps for supply voltage.

(h) *Test No. 6A.* (1) The steps described in paragraph (e)(1) of this section are repeated.

(2) The bilge alarm is fed with a 5 to 10 p.p.m. mixture for eight (8) hours. After eight (8) hours the oil content of the mixture is then increased until the alarm actuates. A sample of the mixture causing actuation is taken.

(i) *Test No. 7A.* (1) All power to the bilge alarm is shut off for one (1) week. After one (1) week the alarm is then started, zeroed, and calibrated.

(2) The steps described in paragraph (e)(1) of this section are repeated. Water is then fed to the monitor for one (1) hour.

(3) The steps described in paragraph (i)(2) are repeated seven (7) additional times. During the last hour, the alarm must be inclined at an angle of 22.5° with the plane of its normal operating position.

§ 162.050-37 Vibration test.

(a) Equipment submitted for Coast Guard approval must first be tested under the conditions prescribed in paragraph (b) of this section. The test must be performed at an independent laboratory that has the equipment to subject the item under test to the vibrating frequencies and amplitudes prescribed in paragraph (b) of this section. The test report submitted with the application for Coast Guard approval must be prepared by the laboratory and must contain the test results.

(b) Each monitor and bilge alarm and each control of a separator must be subjected to continuous sinusoidal vibration in each of the following directions for a 4 hour period in each direction:

(1) Vertically up and down.

(2) Horizontally from side to side.

(3) Horizontally from end to end.

The vibrating frequency must be 80Hz, except that the vibrating frequency of equipment that has a resonant frequency between 2Hz and 80Hz must be the resonant frequency. If the vibrating frequency is between 2Hz and 13.2Hz, the displacement amplitude must be ± 1mm. If the vibrating frequency is between 13.2Hz and 80 Hz, the acceleration amplitude must be ± [(.7)(gravity)].

§ 162.050-39 Measurement of oil content.

(a) *Scope.* This section describes the method and apparatus to be used in measuring the oil content of a sample taken in approval testing of each separator, monitor, or alarm. Light oil fractions in the sample, with the exception of volatile components lost during extractions, are included in each measurement.

(b) *Summary of method.* Each sample is acidified to a low pH and extracted with two volumes of solvent. The oil content of the sample is determined by comparison of the infrared absorbance of the sample extract against the absorbance of known concentrations of a reference oil in solvent.

(c) *Apparatus.* The following apparatus is used in each measurement:

(1) Separatory funnel that is 1000 ml. or more in volume and that has a Teflon stopcock.

(2) Infrared spectrophotometer.

(3) A cell of 5 mm. pathlength that has sodium chloride or infrared grade quartz with a minimum of 80 percent transmittance at 2930 cm^{-1}. (This cell should be used if the oil content of the sample to be measured is expected to have a concentration of between 2 p.p.m. and 80 p.p.m.)

(4) A cell of pathlength longer than 5 mm. that has sodium chloride or infrared grade quartz with a minimum of 80 percent transmittance at 2930 cm^{-1}. (This cell should be used if the oil content of the sample to be measured is expected to have a concentration of between 0.1 p.p.m. and 2 p.p.m.)

(5) Medium grade filter paper.

(6) 100 ml. glass stoppered volumetric flasks.

(d) *Reagents.* The following regaents are used in each measurement:

(1) Hydrochloric acid prepared by mixing equal amounts of concentrated, reagent grade hydrochloric acid and distilled water.

(2) Reagent grade sodium chloride.

(3) One of the following solvents:

(i) Spectrographic grade carbon tetrachloride.

(ii) Reagent grade Freon 113, except that this solvent may not be used to analyze samples in approval testing of cargo monitors. (Ucon 113, Genatron 113, or an equivalent fluorocarbon solvent are also acceptable.)

(4) Reference oil, which is the oil used in the portion of the test during which the sample is collected.

(5) Stock reference standard prepared by weighing 0.30 g. of reference oil in a tared 100 ml. volumetric flask and diluting to 100 ml. volume with solvent.

(e) *Preparation of calibration standards.* A series of dilutions is prepared by pipetting volumes of stock reference standard into 100 ml. volumetric flasks and diluting to volume with solvent. A convenient series of volumes of the stock reference standard is 5, 10, 15, 20, and 25 ml. The exact concentrations of the dilutions in milligrams of oil per 100 milliliters of diluted stock reference standard are calculated. The calibration standards are the dilutions.

(f) *Extraction.* (1) A reagent blank is carried through each step described in this paragraph and paragraph (g) of this section.

(2) The pH of each sample is checked by dipping a glass rod into the sample and touching the rod with pH-sensitive paper to ensure that the pH is 2 or lower. More acid is added if necessary until the pH is 2 or lower. The glass rod is then rinsed in the sample bottle with solvent.

(3) The sample is poured into a separatory funnel and 5 g. of sodium chloride are added.

(4) Fifty (50) ml. of solvent are added to the sample bottle. The bottle is capped tightly and shaken thoroughly to rinse its inside. The contents of the bottle are then transferred to the separatory funnel containing the sample and extracted by shaking vigorously for 2 minutes. The layers are allowed to separate.

(5) The solvent layer is drained through a funnel containing solvent moistened filter paper into a 100 ml. volumetric flask.

(6) Fifty (50) ml. of solvent are added to the sample bottle. The bottle is capped tightly and shaken thoroughly to rinse its inside surface. The contents of the bottle are then transferred to the separatory funnel containing the water layer of the sample. The contents of the separatory funnel are then extracted by shaking vigorously for 2 minutes. The layers are allowed to separate. The solvent layer is then drained through a funnel containing solvent moistened filter paper into the volumetric flask containing the solvent layer of the sample.

(7) The tips of the separatory funnel, filter paper, and funnel are rinsed with small portions of solvent and the rinsings are collected in the volumetric flask containing the solvent layer of the sample. The volume is adjusted with solvent up to 100 ml. The flask is then stoppered and its contents are thoroughly mixed.

(8) The water layer remaining in the separatory funnel is drained into a 1000 ml. graduated cylinder and the water volume estimated to the nearest 5 ml.

(g) *Infrared spectroscopy.* (1) The infrared spectrophotometer is prepared according to manufacturer instructions.

(2) A cell is rinsed with two volumes of the solvent layer contained in the volumetric flask. The cell is then completely filled with the solvent layer. A matched cell containing solvent is placed in the reference beam.

(3) If a scanning spectrophotometer is used, the solvent layer in the cell and the calibration standards are scanned from 3200 cm^{-1} to 2700 cm^{-1}. If a single beam or non-scanning spectrophotometer is used, the manufacturer's instructions are followed and the absorbance is measured at or near 2930 cm^{-1}.

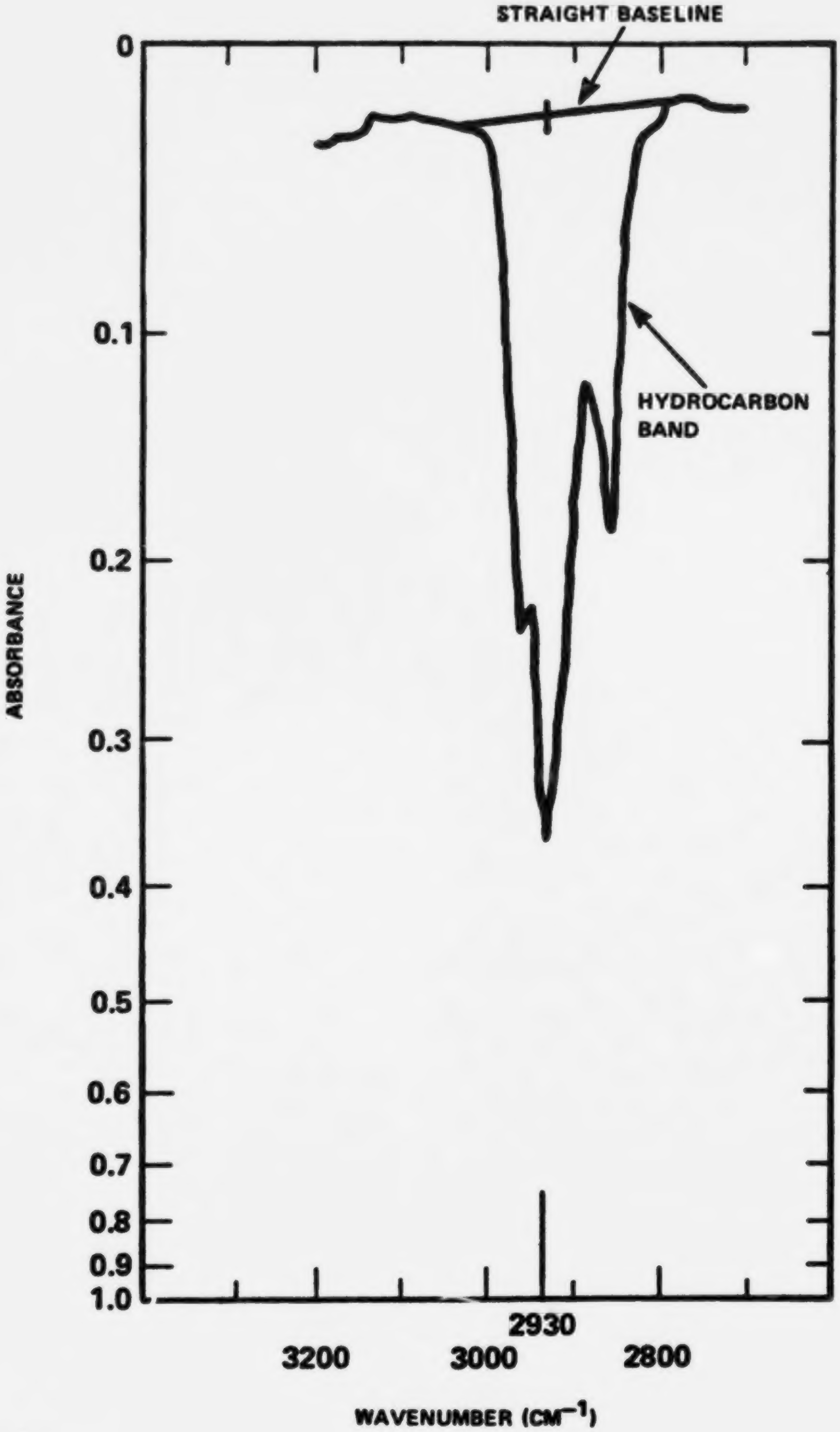
(4) If the scan is recorded on absorbance paper, a straight baseline of the type described in Figure 162.050-39(g) is constructed. To obtain the net absorbance, the absorbance of the baseline at 2930 cm^{-1} is subtracted from the absorbance of the maximum peak on the curve at 2930 cm^{-1}.

(5) If the scan is recorded on transmittance paper, a straight baseline is constructed on the hydrocarbon band plotted on the paper. The net absorbance is:

$$\log_{10} \frac{\%T\ (\text{baseline})}{\%T\ (\text{peak maximum})}$$

(6) A plot is prepared for net absorbance vs. oil content of the calibration standards or of the percentages of stock reference standard contained in the calibration standards.

FIGURE 162,050—39(g) - SPECTRUM ILLUSTRATING BASELINE CONSTRUCTION



(7) If the net absorbance of a sample determined by the calibration plot exceeds 0.8 or the linear range of the spectrophotometer, a dilution of the solvent layer contained in the volumetric flask after completing the step described in paragraph (f)(7) of this section is prepared by the pipetting an appropriate volume of the solvent layer into a second volumetric flask and diluting to volume with solvent. If the net absorbance is less than 0.1 when determined in accordance with the procedures in this paragraph, it is recalculated using a longer pathlength cell.

(h) *Calculations.* (1) The plot described in paragraph (g)(6) of this section is used to determine the milligrams of oil in each 100 ml. of solvent layer contained in the volumetric flask after completing the steps described in paragraph (f) or paragraph (g)(7) of this section.

(2) The oil content of the sample is calculated using the following formula:

oil content of sample $= R \times D \times 1000/V$

R = mg. of oil in 100 ml. of solvent layer determined from plot.

D = 1 or, if the step described in paragraph (g)(7) of this section is performed, the ratio of the volume of the second volumetric flask described in that paragraph to the volume of solvent layer pipetted into the second volumetric flask.

V = The volume of water in milliliters drained into the graduated cylinder at the step described in paragraph (f)(8) of this section.

(3) The results are reported to two significant figures for oil contents below 100 mg/l and to three significant figures for oil contents above 100 mg/l. The results are converted to p.p.m.

PART 163—CONSTRUCTION

Subpart 163.001—Doors, Watertight, Sliding (and Door Controls), for Merchant Vessels

Sec.
163.001-1 Applicable specifications.
163.001-2 General requirements for sliding watertight doors.
163.001-3 Construction of sliding watertight doors.
163.001-4 Manual operating controls for sliding watertight doors.
163.001-5 Power operating controls for sliding watertight doors.
163.001-6 Inspection and testing of doors and controls.
163.001-7 Nameplate and marking.
163.001-8 Procedure for approval of doors and controls.

Authority: R.S. 4405, as amended, 4462, as amended; 46 U.S.C. 375, 416. Interpret or apply R.S. 4417, as amended, 4417a, as amended, 4418, as amended, 4426, as amended, 4488, as amended, 4490, as amended, sec. 14, 29 Stat. 690, as amended, 41 Stat. 305, as amended, sec. 2, 45 Stat. 1493, as amended, sec. 2, 49 Stat. 888, as amended, sec. 5, 49 Stat. 1384, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, sec. 3, 54 Stat. 347, as amended, sec. 3, 70 Stat. 152, sec. 3, 68 Stat. 675; 46 U.S.C. 391, 391a, 392, 404, 481, 482, 366, 363, 85a, 88a, 369, 367, 1333, 390b, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-20, June 18, 1956, 21 FR 4894; CGFR 56-28, July 24, 1956, 21 FR 5659; 167-38, Oct. 26, 1959, 24 FR 8857; 167-48, Oct. 19, 1962, 27 FR 10504.

Source: CGFR 50-30, 16 FR 1086, Feb. 6, 1951, unless otherwise noted.

Subpart 163.001—Doors, Watertight, Sliding (and Door Controls), for Merchant Vessels.

§ 163.001-1 Applicable specifications.

(a) There are no other specifications applicable to this subpart except as noted herein.

§ 163.001-2 General requirements for sliding watertight doors.

(a) *Applicability.* The requirements of this subpart apply to all new sliding watertight doors to be installed on merchant vessels. Sliding watertight doors approved and in use prior to these specifications may be continued in service as long as in good and serviceable condition.

(b) *Types.* Sliding watertight doors may be either the horizontal sliding type or the vertical sliding type, classed as follows:

(1) *Class 2.* Sliding doors operated both locally and remotely by hand gear.

(2) *Class 3.* Sliding doors operated both locally and remotely by hand and by power.

(c) *Location.* The permitted locations of the several types of watertight doors are contained in Subchapter E—Load Lines of this chapter.

(d) *Basic requirements.* Sliding watertight doors shall be efficiently designed to maintain watertightness within the limits set forth in the specifications in this part. They shall be designed to open and close with ease when operated with the required operating gear.

(e) *Alternatives.* The requirements of this subpart shall be complied with unless other arrangements in matters of construction details, design, strength, equivalent in safety and efficiency are approved by the Commandant.

§ 163.001-3 Construction of sliding watertight doors.

(a) *Material.* The door panel and the door frame shall be made of cast steel and/or fabricated steel unless otherwise specifically approved by the Commandant. Cast doors and frames and welded doors and frames shall be stress relieved before final machine work is done.

(b) *Contact strips.* Brass strips or other acceptable material shall be firmly screwed on the door to form the contact watertight surface of the door and frame. The contact watertight surface of the frame may be the machined parent metal of the frame. Special consideration will be given to other methods of attaching the strips to the door.

(c) *Rigidity.* The door and frame shall be of substantial and rigid construction to insure that the door can be closed under a 10 foot head of water. In locations where hinged doors are permitted, this requirement will not apply.

(d) *Adjustment.* The door shall be so designed that as the watertight joint wears through usage sufficient allowance or adjustment is provided to maintain the original watertight integrity of the door.

(e) *Alignment.* Retaining grooves or aligning strips shall be provided at the top and bottom of horizontal sliding doors and at the sides of vertical sliding doors to maintain the door in alignment when the door is not in the closed position. They should have sufficient strength to hold the door when being closed against a head of water as required in paragraph (c) of this section. Horizontal doors shall be supported on lubricated rollers to maintain alignment and to minimize friction.

(f) *Watertight workmanship.* The contact surfaces of the door and frame shall be finished as necessary to provide a plane surface and a satisfactory joint.

(g) *Door sill design.* The bottom of the door frame shall be so designed that the door is not likely to be prevented from closing properly by lodgements of dirt, coal, etc. A sill plate of $\frac{3}{16}$ inch minimum thickness may be employed to cover the bottom trackway provided it is designed to automatically retract when the door closes. Sill plate hinges shall be designed and located to prevent clogging with dirt.

(h) *Door positions.* The door shall be so designed that, when in the open position, the brass strips required by paragraph (b) of this section will not be exposed. Door stops shall be provided to prevent the door from leaving the track.

(i) *Door frame design.* (1) The door frame shall be continuous on all four sides and shall be designed to have a section moment of inertia (in.^4) on each side of not less than the value given by the formula:

$$I = .002\,Hwh^3 \tag{1}$$

where:

H=the head of water in feet from the bulkhead deck to the bottom of the door opening, but not less than 20 feet unless the door is to be installed where a hinged door is permissible in which case H may be not less than 10 feet.

w=the shorter dimension of the opening in feet.

h=the longer dimension of the opening in feet.

(2) If the door frame is to be mounted on the bulkhead on a reinforcing member, which acts as a secondary frame and which is continuous around the door opening, the "I" of that

member may be included to obtain the required frame *"I"* value.

(j) *Door frame attachment.* The door frame may be either bolted or welded watertight to the bulkhead. If bolted, a suitable thin heat and fire resistant gasket or suitable compound shall be used between the bulkhead and the frame for watertightness, and the bulkhead plating shall be worked to a plane surface in way of the frame to prevent distortion of the frame when mounting. If welded, precaution shall be exercised in the welding process in order that the door frame is not distorted.

(k) *Door frame extension.* The frame extension for sliding watertight doors shall be made in one continuous piece, or suitable construction shall be employed to insure positive alignment.

(l) *Lubrication.* Means shall be provided for satisfactory lubrication of all parts as necessary for satisfactory operation.

[CGFR 50-30, 16 FR 1086, Feb. 6, 1951, as amended, by CGFR 61-15, 26 FR 9302, Sept. 30, 1961]

§ 163.001-4 Manual operating controls for sliding watertight doors.

(a) *Manual control locations.* All sliding watertight doors shall be provided with manual operating controls for opening and closing the door from both sides of the bulkhead adjacent to the door and also for closing the door from a position above the bulkhead deck. The controls adjacent to the door shall generally not be more than 10 feet from the door. The bulkhead deck, for door control purposes, is the first deck above the margin line.

(b) *Basic requirement.* Manual operating equipment shall be designed to close the door at the required operating rate with a force at the handwheel or hand crank of not more than 25 pounds, except that a force of 50 pounds may be accepted during the wedging.

(1) With the vessel upright it shall be possible to close class 2 doors in not more than 90 seconds.

(2) With the vessel upright it shall be possible to close class 3 doors at a rate of not less than 15 inches per minute by means of the manual operating equipment.

(c) *Shafting and gear controls.* Where shafting and gears are used for manual control, the following conditions apply:

(1) *Handwheels.* Handwheels at least 18 inches in diameter shall be provided and permanently attached at each hand operating station in an accessible position for operation. In unusual circumstances, other arrangements will be considered by the Commandant. Shafting from the handwheels to the door pinions shall be as direct as possible with as few gears and universals as practicable.

(2) *Gears and universals.* Gears used in the operating controls shall be cut steel or other approved material. Standard forged steel universals and slip joint couplings shall be used to allow for working of the ship or deflection of structure. Universals shall not be used where there is more than 25° change in direction of the shafting. Universals, bearings, and gears shall have suitable provision for lubrication and should be enclosed to retain the lubricant and encased as necessary to prevent entry of foreign matter. Inaccessible bearings, and those in long leads of control shafting, shall be preferably of the antifriction "grease sealed" type, for which no additional means of lubrication will be required. No clutch devices shall be employed in the hand gear mechanism.

(3) *Keys and pins.* All parts transmitting torque shall be keyed or splined. Taper pins may be used only to prevent axial movement.

(4) *Door securing device.* If frictional damping is found insufficient to prevent movement of the door in a seaway or from other external forces, provision shall be made in the design of door or operating gear for the attachment of a spring latch or other approved device for securing the door in the open position. This device shall be released or forced out of engagement automatically, without hampering the closing operation.

(5) *Factor of safety.* In general, the manual control shafting, gears, universals, etc., shall be designed with a factor of safety of 5 based on the ultimate strength of the material in conjunction with a torque of 2,000 pounds-inches at the handwheels.

While short shafts, such as gear box stub shafts, may be proportioned in accordance with the foregoing, the longer runs of shafting between the remote manual station and the door shall not be less than 1¼ inches diameter.

(d) *Hydraulic manual controls.* Where a hydraulic system is used for manual control, the following conditions apply:

(1) *Hand pumps.* Hand pumps operated by an all round crank motion shall be provided at each hand operating station in an accessible position for operation. A single hand pump may be provided at the door location if it is arranged so that it can be operated from either side of the bulkhead. The pump or pumps at the door station shall be reversible. The pump at the remote control station may be arranged to close the door only, and the direction of rotation shall be marked. Cranks or handwheels for turning shall be permanently attached, although in unusual circumstances, other arrangements will be considered by the Commandant. No remote pump shall operate more than one door.

(2) *Control valves.* Unless otherwise approved, the action of valves selecting the hydraulic circuits between pumps and operating cylinders or hydraulic motors shall be automatic with the operation of any one or more pumps. The valves or pumps shall be so arranged as to prevent the overhauling of an idle pump as a hydraulic motor, and they shall be so arranged as to hydraulically block the door operator to prevent movement of the door in a seaway.

(3) *Hydraulic systems.* In general the requirements in Subchapter F—Marine Engineering of this chapter shall apply in the selection of materials and scantlings, submittal of plans and diagrams and in the testing of components and the complete shipboard installation of hydraulic systems for the operation of sliding watertight doors.

(e) *Direction of control rotation.* The handwheels or cranks at the remote stations shall turn in a clockwise direction to close the door.

(f) *Mechanical indicator.* The manual operating station above the bulkhead deck shall be provided with a mechanical indicator to show whether the door is open or closed. This indicator shall be independent of the manual control shafting when the door is fitted with power controls.

(g) *Guards.* Adequate guards shall be provided over moving parts of the control equipment to prevent the possibility of damage or jamming.

[CGFR 50-30, 16 FR 1086, Feb. 6, 1951, as amended by CGFR 61-15, 26 FR 9302, Sept. 30, 1961]

§ 163.001-5 Power operating controls for sliding watertight doors.

(a) *Types of power.* Sliding watertight doors that are required to be power operated in addition to manual operation shall be fitted with the necessary equipment to use electric power, hydraulic power, or any other power supply that is acceptable to the Coast Guard.

(b) *Power control arrangement.* Power operated sliding watertight doors shall be provided with power controls for opening and closing the door from both sides of the bulkhead adjacent to the door and also for closing from a central control station on the bridge. These controls shall be arranged as follows:

(1) *Automatic reclosing.* The door, when opened by the local control after being closed from the central control, shall automatically reclose when the local control is released.

(2) *Prevention of remote operation.* Where means are provided to open doors from the central control, each door shall be arranged so that it can be kept closed by means of local arrangements which shall prevent the door from being opened from the central control.

(3) *Accessibility of local power controls.* The local control handles at each side of the bulkhead shall be so located that they may be held in the open position when a person is passing through the doorway, and shall be at least 48 inches above the deck. The direction of movement of the handles to open and close the door shall be clearly marked.

(4) *Operation.* The sliding watertight doors under power operation

shall close at an approximately uniform rate of speed within the limits of one to two inches per second, and the power operator shall be capable of closing horizontal sliding doors in a reasonable length of time against a list of 15 degrees when the potential at the supply source is reduced to 87.5 percent of normal. The capacity of the accumulators or storage batteries shall be sufficient to open all doors twice and close them three times without recharging.

(c) *Central control panel.* The central control panel shall be arranged as follows:

(1) *Simultaneous closing.* Means shall be provided for closing all doors simultaneously. However, when electrically operated doors are energized from the temporary emergency lighting and power system and a large number of doors are involved, automatic means may be provided for operating the doors in sequence, preference in closing being given to doors in the lowest part of the vessel. Where sequential operation is employed, the arrangement shall be such that all doors can be closed in not more than 60 seconds after actuation of the single master control.

(2) *Diagram.* A diagram shall be provided showing the location of each door on the deck or decks with visual indicators for each door to show whether the door is open or closed. A red light shall indicate the door is open and a green light shall indicate that it is closed and both lights shall indicate that it is in an intermediate position.

(d) *Warning sound signal.* Provision shall be made at the door to give warning by sound signal when the door is about to be closed. A minimum time interval of 20 seconds shall be provided between the time of sounding of the warning signal and the time the door reaches the closed position, but in any case the sounding of the warning shall precede the movement of the door into the clear opening in the bulkhead by at least 1 second. The warning sound signal shall be of the electric horn or howler type.

(e) *Hand gear operation with power controls.* Provision shall be made to prevent the hand gear from turning when the door is operated by the power unit. The arrangement shall be such that failure of the power unit or power supply will not prevent the door from being operated manually.

(f) *Construction of power components.* The construction of electrical, hydraulic and pneumatic components used with power operators shall be in accordance with the general requirements of Subchapters D, F, G, H, I or J of this chapter. If the power and hand operating systems are hydraulic, each driving a hydraulic operator at the door common to both, the requirements of § 163.001-4(d) shall extend, where applicable, to include the power pumping unit. The enclosures for electrical components of the door operators at the door position shall be waterproof. The power unit shall be protected from injury due to a jammed door, excessive electrical current or excessive hydraulic or pneumatic pressure. No clutch devices shall be employed.

(g) *Protection against faults.* Connections shall be such and circuits shall be so protected against overcurrent that a failure in a door circuit shall not be the cause of failure in any other door circuit and that a short circuit or other fault in the alarm and indicator circuit will not result in loss of power for door operation. The connections shall be such that leakage of salt water into the local controller shall not establish a circuit which will cause the door to open.

[CGFR 50-30, 16 FR 1086, Feb. 6, 1951, as amended at CGFR 61-15, 26 FR 9302, Sept. 30, 1961]

§ 163.001-6 Inspection and testing of doors and controls.

(a) *Shop tests and inspection*—(1) *Hydrostatic test.* Each door upon completion shall be subjected to a hydrostatic shop test to determine the strength, rigidity, workmanship and watertightness of the door. Inspectors shall witness each such test; however, in cases where this is impractical and a sufficient number of identical door tests have been witnessed and approved, the manufacturer may conduct the tests on additional doors of that design and certify to the Coast

Guard that the test results are in accord with these specifications. However, the inspectors shall make periodic examinations and tests as deemed necessary to insure specifications standards.

(2) *Examination.* The inspector shall examine the door and frame for conformance with the approved plans and for the workmanship involved.

(3) *Hydrostatic test set-up.* The door frame shall be mounted in either a vertical or horizontally flat position on a reinforced test plate or slab. A gasket may be used between the door frame and the closing plate for watertightness. Means shall be provided to vent air from the enclosure formed by the door, frame and plate and to supply water, at the required test pressure, to this enclosure. Means shall also be provided for catching and measuring the amount of water which leaks between sealing surfaces of door panel and frame. Except in the case of double seated doors, it will only be necessary to apply pressure to that side of the door which will tend to separate the sealing surfaces.

(4) *Hydrostatic test procedure.* The contact surfaces of the door and frame shall be wiped to remove excess grease and oil. The door shall be closed by operating equipment restricting the amount of closing force to that available from the operating gear to be used in the shipboard installation. The enclosure shall then be completely filled with water, air shall be vented and the test pressure shall be held for at least ten minutes, during which time the leakage rate shall be determined. The test pressure shall not be less than that corresponding to a head of water from the proposed location of the door sill in the vessel to the bulkhead deck or 20 feet, whichever is greater, except that the test head may be 10 feet if the door is to be installed where a hinged door is permissible. The measured leakage rate shall not exceed that given by the following formula (1) except that below a 20-foot head pressure 5 gallons per hour is acceptable:

$$\text{Leakage rate (gal/hr.)} = \frac{(P+15)}{30}\left(\frac{h^3}{1600} \text{ or } \frac{p^3}{130}\right) \qquad (1)$$

Where: P = perimeter of door opening (feet)
h = test head (feet)
p = pressure (lb/sq. in)

(5) *Shop test of operating controls.* One door and frame of each design together with its manual operating equipment and in addition its power control equipment if a class 3 door, shall be mounted on a structure in the shop in a vertical position. The set-up for horizontal sliding doors shall be such that it can be heeled to simulate 15° port and starboard lists. The door shall be listed 15° and the operating equipment tested to demonstrate that the manual controls can close the door against an adverse list and in addition for class 3 doors that electrical and hydraulic operators can close the door under reduced potential as specified in § 163.001-5 (c). The 15° opposite list shall demonstrate that the door will not overhaul and close itself and when closed can be opened manually and by power. These tests for class 3 doors shall also show that the door can be unseated manually after power closing. In lieu of a tilting arrangement, the door may be mounted vertically in a level position and the list may be simulated by leading lines alternately in the closing and in the opening directions, over efficient fairleads to counterweights.

(b) *Installation tests and inspection*—(1) *Bulkhead reinforcement.* Before the sliding watertight door is installed in a vessel, the bulkhead in the vicinity of the door opening shall be stiffened in accordance with plans previously submitted by the shipyard or naval architect and approved by the Coast Guard Such bulkhead stiffeners shall not be less than 6 inches nor more than 12 inches from the door frame in order that an unstiffened diaphragm of bulkhead plating 6 to 12 inches wide is provided completely around the door frame. Where such limits cannot be maintained, special consideration will be given to the particular installation. In determining the scantlings of these bulkhead stiffeners, the door frame should not be considered as contributing to the strength of the bulkhead. Provision shall also be made to adequately support the thrust bearings and other equipment that may be mounted on the bulkhead or deck.

(2) *Manual control installation test.* After the door and controls have been installed, the door shall be closed and opened by means of the manual controls at the door and shall be closed by the manual remote control. The time and effort required to close the door shall be within the limitations prescribed in § 163.001-4(b).

(3) *Power control installation test.* If power controls are provided, the door shall be operated by the power controls from each of the three control stations. The rate of closing shall be as prescribed in § 163.001-5(b)(4). Manual controls shall also be operated to show that closure by power will not jam the door so as to prevent manual opening.

(4) *Mechanical indicator operation.* The door indicator at the remote manual control station shall correctly show the position of the door when either manual or power operation is employed.

(5) *Test for tightness.* The door sealing strips shall be examined insofar as possible without dismantling the door, and any surface blemishes shall be corrected by stoning or draw-filing. The door shall then be closed and the degree of contact between the door and frame shall be such as to reject the insertion of a 0.003 inch feeler gage, or its clear passage through and between the sealing surfaces, at any point around the sealing perimeter.

[CGFR 50-30, 16 FR 1086, Feb. 6, 1951, as amended by CGFR 61-15, 26 FR 9302, Sept. 30, 1961; CGD 79-165a, 45 FR 64189, Sept. 29, 1980]

§ 163.001-7 Nameplate and marking.

(a) *Watertight door nameplate.* A substantial corrosion-resistant nameplate shall be permanently attached to each watertight door on which is stamped the name of the manufacturer, manufacturer's symbol and/or serial number, type designation, test head, the inspector's initials, and the date. Where the tests have been witnessed by a Coast Guard inspector, the Marine Inspection Office identification letters are used, followed by the letters "U.S.C.G." Where the tests have been witnessed by the manufacturer's inspector in lieu of a Coast Guard marine inspector, as permitted by § 163.001-6(a)(1), the manufacturer's inspector shall stamp his initials, which shall be followed by the manufacturer's name or other symbol identifying the manufacturer.

(b) *Markings.* Shipboard markings for watertight doors and operating controls shall be in accordance with the applicable requirements of Subchapters G, H, I, or J of this chapter.

(46 U.S.C. 375, 416, 481; 49 U.S.C. 1655(b); 49 CFR 1.4(b), and 1.46)

[CGFR 50-30, 16 FR 1086, Feb. 6, 1951, as amended by CGFR 54-46, 19 FR 8708, Dec. 18, 1954; CGD 75-186, 41 FR 10437, Mar. 11, 1976]

§ 163.001-8 Procedure for approval of doors and controls.

(a) *Plan submittal.* Before action is taken on any design of sliding watertight doors and operating equipment, detailed plans covering fully the arrangement and construction of the door and construction of the control equipment shall be submitted to the Commandant through the Commander of the Coast Guard District in which the door and control equipment is to be manufactured.

(b) *Supervision of construction.* If such drawings are satisfactory, the manufacturer shall advise the Commander of the Coast Guard District when fabrication is to commence. Supervision of the construction will then be made in accordance with the plans. The inspector will conduct the required tests and upon satisfactory completion will stamp the name plate as provided in § 163.001-7(a).

(c) *Corrected plans.* When the tests required by § 163.001-6(a) (1) to (5) are successfully completed, the manufacturer shall submit four corrected copies of the construction and arrangement plans including any corrections, changes, or additions which may have been found necessary during the construction or testing. If the manufacturer desires more than one set of approved plans, additional copies shall be submitted at that time. On subsequent doors and controls where plans covering the complete unit have previously been approved, it may not be necessary to resubmit the plans, although all tests required by the specifications shall be conducted.

(d) *Installation plans.* For each installation on shipboard, plans shall be submitted to the Coast Guard for approval showing specific location and arrangement of the door and controls in the vessel together with a complete bill of material. In addition, plans showing bulkhead reinforcement in way of watertight door openings shall be submitted.

PART 164—MATERIALS

Subpart 164.001—Cork, Sheet, for Merchant Vessels

Sec.
164.001-1 Applicable specifications.
164.001-2 Grade.
164.001-3 Material and workmanship.
164.001-4 Inspection.
164.001-5 Procedure for approval.

Subpart 164.002—Balsa Wood for Merchant Vessels

164.002-1 Applicable specifications.
164.002-2 Grade and densities.
164.002-3 Material.
164.002-4 Defects permitted.
164.002-5 Inspection.
164.002-6 Procedure for approval.

Subpart 164.003—Kapok, Processed

164.003-1 Applicable specifications.
164.003-2 Grades.
164.003-3 Material and workmanship.
164.003-4 Inspections and tests.
164.003-5 Procedure for approval.

Subpart 164.006—Deck Coverings for Merchant Vessels

164.006-1 Applicable specifications.
164.006-2 Grades.
164.006-3 Construction, materials, and workmanship.
164.006-4 Inspection and testing.
164.006-5 Procedure for approval.

Subpart 164.007—Structural Insulations

164.007-1 Applicable specification and referenced material.
164.007-2 Purpose.
164.007-3 Conditions of approval.
164.007-4 Testing procedure.
164.007-5 Test requirements.
164.007-6 Test report.
Sec.
164.007-7 Analysis of results.
164.007-8 Retests.
164.007-9 Procedure for approval.

Subpart 164.008—Bulkhead Panels

164.008-1 Applicable specification and reference material.
164.008-2 Conditions of approval.
164.008-3 Testing procedure.
164.008-4 Test requirements.
164.008-5 Test report.
164.008-6 Retests.
164.008-7 Procedure for approval.

Subpart 164.009—Noncombustible Materials for Merchant Vessels

164.009-1 General.
164.009-3 Applicable documents.
164.009-5 Noncombustible materials not requiring specific approval.
164.009-7 Contents of application.
164.009-9 Procedure for approval.
164.009-11 Furnace apparatus.
164.009-13 Furnace calibration.
164.009-15 Test procedure.
164.009-17 Density measurement.
164.009-19 Measurement of moisture and volatile matter content.
164.009-21 Laboratory report.
164.009-23 Factory inspection.
164.009-25 Marking.

Subpart 164.012—Interior Finishes for Merchant Vessels

164.012-1 Applicable specifications.
164.012-5 Scope.
164.012-10 Requirements.
164.012-11 Marking.
164.012-12 Recognized laboratory.
164.012-13 Examinations, tests, and inspections.
164.012-14 Procedure for listing and labeling.
164.012-15 Termination of listing and labeling.

Subpart 164.013—Foam, Unicellular Polyethylene (Buoyant, Slab, Slitted Trigonal Pattern)

164.013-1 Applicable specifications and plans.
164.013-2 Grades.
164.013-3 Material and workmanship.
164.013-4 Inspections and tests.
164.013-5 Procedure for acceptance.

Subpart 164.015—Plastic Foam, Unicellular, Buoyant, Sheet and Molded Shape

164.015-1 Applicable specifications and standards.
164.015-2 Types.
164.015-3 Material and workmanship.

Sec.
164.015-4 Inspections and tests.
164.015-5 Procedure for acceptance.

Subpart 164.016—Microcellular Nylon, Sheet and Molded Shapes

164.016-1 Reference specifications and standards.
164.016-2 Types.
164.016-3 Material and workmanship.
164.016-4 Inspections and tests.
164.016-5 Procedure for acceptance.

Subpart 164.018—Retroreflective Material for Lifesaving Equipment

164.018-1 Scope.
164.018-3 Classification.
164.018-5 Specifications and standards incorporated by reference.
164.018-7 Approval procedures.
164.018-9 Design requirements.
164.018-11 Approval tests.
164.018-13 Production inspections.

Subpart 164.001—Cork, Sheet, for Merchant Vessels

AUTHORITY: R.S. 4417a, as amended, 4426, as amended, 4488, as amended, 4491, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, secs. 6, 17, 54 Stat. 164, as amended, 166, as amended, sec. 3, 54 Stat. 347, as amended, sec. 3, 70 Stat. 152, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 404, 481, 489, 367, 526e, 526p, 1333, 390b, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14 Nov. 26, 1954, 19 FR 8026; 167-20, June 18, 1956, 21 FR 4894; 167-38, Oct. 26, 1959, 24 FR 8857.

SOURCE: CGFR 48-23, 13 FR 3543, June 26, 1948, unless otherwise noted.

§ 164.001-1 Applicable specifications.

(a) There are no other specifications applicable to this subpart.

§ 164.001-2 Grade.

(a) Sheet cork shall be of but one grade as specified in this subpart.

§ 164.001-3 Material and workmanship.

(a) *Freedom from imperfections.* The cork sheets shall be good quality cleaned cork, free from excessive bark, or cracks or other imperfections that will reduce its strength. The cork shall be considered free from cracks when 95 percent of the pieces are free from cracks greater than half the thickness of the sheet by ⅜-inch wide.

§ 164.001-4 Inspection.

(a) Sheet cork, to be used in a finished product subject to inspection by the Coast Guard, shall be subject to inspection at the plant of the manufacturer to determine compliance with the requirements of this specification.

(b) Acceptance of sheet cork prior to being incorporated into finished products, or during the course of manufacture, shall in no case be construed as acceptance of the finished product.

§ 164.001-5 Procedure for approval.

(a) Sheet cork is not subject to formal approval, but will be accepted by the inspector on the basis of this specification for use in the manufacture of lifesaving equipment utilizing it.

Subpart 164.002—Balsa Wood for Merchant Vessels

AUTHORITY: R.S. 4417a, as amended, 4426, as amended, 4488, as amended, 4491, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, secs. 6, 17, 54 Stat. 164, as amended 166, as amended, sec. 3, 54 Stat. 347, as amended, sec. 3, 70 Stat 152, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 404 481, 489, 367, 526e, 526p, 1333, 390b, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-20, June 18, 1956, 21 FR 4894; 167-38, Oct. 26, 1959 24 FR 8857.

SOURCE: CGFR 48-23, 13 FR 3543, June 26, 1948, unless otherwise noted.

§ 164.002-1 Applicable specifications.

(a) There are no other specifications applicable to this subpart.

§ 164.002-2 Grade and densities.

(a) Balsa wood shall be of one grade as specified in this subpart, and of the following densities:

(1) Density A—8½ to 12 pounds per cubic foot.

(2) Density B—5 to 9 pounds per cubic foot.

§ 164.002-3 Material.

(a) *General.* Balsa wood shall be of the genus Ochroma. It shall be sound, square edge, kiln dried to a moisture content not exceeding 12 percent, and shall be free from rot, dote, large or unsound knots, wormholes, and other injurious defects, except those specified as admissible in § 164.002-4.

(b) *Size.* Balsa wood pieces shall be of a size suitable for use in the item of equipment utilizing it.

§ 164.002-4 Defects permitted.

(a) One sound, tight knot, not over 1¼ inches in diameter, will be permitted in each full 4 feet of length of any piece. Pin wormholes, or their equivalent, will be permitted provided their size does not exceed 1/32 inch in diameter and their number is less than 150 in each 5 square feet surface measure, with no concentration of more than 40 pin wormholes in any square foot of surface area. Inclosed pith less than 1 inch in diameter will not be considered a defect. Surface pith and pith grooves on faces and/or edges, not exceeding 1 inch in diameter and in the aggregate ⅙ of the length of the piece will be permitted. Wane not exceeding ⅛ inch width on the surfaces on which it appears, sound wavy grain, or bird's eyes and twig specks less than 1 inch in smallest dimension, and sound stain, will be permitted.

§ 164.002-5 Inspection.

(a) Balsa wood, to be used in a finished product subject to inspection by the Coast Guard, shall be subject to inspection at the plant of the manufacturer to determine compliance with the applicable requirements of this specification.

(b) Acceptance of balsa wood prior to being incorporated into finished products, or during the course of manufacture, shall in no case be construed as acceptance of the finished product.

§ 164.002-6 Procedure for approval.

(a) Balsa wood is not subject to formal approval, but will be accepted by the inspector on the basis of this specification for use in the manufacture of lifesaving equipment utilizing it.

Subpart 164.003—Kapok, Processed

AUTHORITY: R.S. 4417a, as amended, 4426, as amended, 4488, as amended, 4491, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, secs. 6, 17, 54 Stat. 164, as amended, 166, as amended, sec. 3, 54 Stat. 347, as amended, sec. 3, 70 Stat. 152, sec. 3, 68 Stat. 675; 46 U.S.C. 391a, 404, 481, 489, 367, 526e, 526p, 1333, 390b, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-20, June 18, 1956, 21 FR 4894; 167-38, Oct. 26, 1959, 24 FR 8857.

SOURCE: 11 FR 188, Jan. 3, 1946, unless otherwise noted.

§ 164.003-1 Applicable specifications.

(a) There are no other specifications applicable to this subpart.

§ 164.003-2 Grades.

(a) Processed kapok shall be of but one grade as in this subpart.

§ 164.003-3 Material and workmanship.

(a) The raw kapok fiber shall be long, clean, creamy white in color, lustrous, free from discoloration and adulteration with other fiber, and of a quality equal to that grown in Java.

(b) Kapok shall be processed by teasing in a machine using the air-blow method. Mechanical separation of fiber masses is permitted, but machines using violent beating which breaks down the fibers or causes undue powdering or pulverizing are not permitted. Provision shall be made for trapping seeds and heavy objects in gravity traps and the dust or powder in an efficient dust collector.

(c) Processed kapok shall have a buoyancy in fresh water of at least 48 pounds per cubic foot when tested in accordance with § 164.003-4(d). Rejected kapok shall not be used in lifesaying products inspected by the Coast Guard.

(d) The processed kapok shall contain not more than 5 percent by weight of sticks, seeds, dirt or other foreign material and shall be free from objectionable odor and adulteration with other fibers.

§ 164.003-4 Inspections and tests.

(a) Kapok fibers to be used in a finished product subject to inspection by the Coast Guard shall be subject to inspection and tests at the plant of the manufacturer of such product, who shall furnish the necessary testing tank, test cages, and scales.

(b) Acceptance of kapok prior to being incorporated into finished products, or during the course of manufacture, shall in no case be construed as a guarantee of the acceptance of the finished product.

(c) Not less than a one-pound sample from each 1,000 pounds of kapok shall be tested for buoyancy by the inspector. At his discretion, the inspector may select additional samples for tests if deemed advisable.

(d) The buoyancy test shall be made with 16 ounces of processed kapok uniformly packed in a rigid wire box or cage with metal reinforced edges, and submerged by weights in a tank of fresh water to a depth of 12 inches below the surface of the water, measurement made to the top of box, for 48 hours. The test box shall be cylindrical in shape, and as nearly as practicable ⅓ cubic foot in volume, 4 inches deep, 13.54 inches diameter, all inside measurements; constructed of about 0.065 inch galvanized iron wire with about ¼ inch mesh, and lined with about 0.007 inch copper wire screen about 18 meshes to the inch, to prevent the kapok from pushing out through the larger wire meshes. At the end of forty-eight hours submergence, the buoyancy shall be determined by subtracting the submerged weight of the box, accessory weights and kapok from the submerged weight of the box and weights without the kapok, and dividing the remainder by the volume of the kapok expressed in cubic feet.

(e) Kapok fiber shall, at the option of the inspector, be subjected to a microscopic examination to detect adulteration with other fiber.

(f) Processed kapok shall, at the option of the inspector, be subjected to separation of kapok fibers from foreign matter by hand, the portions of each weighed, and percentage of foreign matter computed for compliance with § 164.003-3(d).

§ 164.003-5 Procedure for approval.

(a) Processed kapok is not subject to formal approval, but will be accepted by the inspector on the basis of this subpart for use in the manufacture of lifesaving equipment utilizing it.

Subpart 164.006—Deck Coverings for Merchant Vessels

AUTHORITY: R.S. 4417, as amended, 4417a, as amended, 4418, as amended, 4426, as amended, 4488, as amended, sec. 5, 49 Stat. 1384, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, sec. 3, 54 Stat. 347, as amended, sec. 3, 70 Stat. 152, sec. 3, 68 Stat. 675; 46 U.S.C. 391, 391a, 392, 404, 481, 369, 367, 1333, 390b, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-20, June 18, 1956, 21 FR 4894; CGFR 56-28, July 24, 1956, 21 FR 5659; 167-38, Oct. 26, 1959, 24 FR 8857.

SOURCE: CGFR 53-25, 18 FR 7874, Dec. 5, 1953, unless otherwise noted.

§ 164.006-1 Applicable specifications.

(a) There are no other specifications applicable to this subpart.

§ 164.006-2 Grades.

(a) Deck coverings shall be of but one grade as specified in this subpart, and shall be known as "an approved deck covering."

§ 164.006-3 Construction, materials, and workmanship.

(a) It is the intent of this specification to obtain a deck covering made largely of incombustible materials with low heat transmission qualities which will produce a minimum of smoke when exposed to high temperatures.

(b) Deck coverings shall be of such a quality as to successfully pass all of the tests set forth in § 164.006-4.

§ 164.006-4 Inspection and testing.

(a) All tests shall be conducted at the National Bureau of Standards or other laboratories designated by the Coast Guard.

(b) *Smoke tests.* (1) A sample of each thickness submitted shall be tested for smoke emission. Each sample shall be laid on a ¼" x 12" x 27" steel plate. Normal protective coatings and deck attachments shall be incorporated in the samples. Each sample shall be heated in a furnace whose temperature is limited to the standard decking curve reaching 1,325 degrees F. at the end of one hour. Smoke observations shall be made at intervals not greater than five minutes during the one-hour period of test.

(2) Instantaneous values of the percent of light transmission shall be calculated from the observations noted in paragraph (b)(1) of this section. A plot of light transmission values shall be made using straight lines between instantaneous values.

(3) Any instantaneous value of 10 percent light transmission or less shall be considered sufficient cause for rejection of a deck covering.

(4) Average values of light transmission shall be calculated for 15, 30, and 60 minutes. Averages shall be an arithmetic mean with values taken at one minute intervals from the plotted curve noted in paragraph (b)(2) of this section. If any of the three average values of light transmission is less than the values set forth below, it will be considered sufficient cause for rejection of a deck covering:

15 minutes—90 percent light transmission.
30 minutes—60 percent light transmission.
60 minutes—50 percent light transmission.

(c) *Fire resistance and integrity tests.* (1) A sample of each thickness submitted shall be tested for fire resistance and integrity. Each sample shall be laid on a ¼″ x 12″ x 27″ steel plate. Normal protective coatings and deck attachments shall be incorporated in the samples. Each sample shall be heated in a furnace whose temperature is controlled according to the standard fire exposure curve reaching 1,700 degrees F. at the end of one hour. Temperature of the unexposed side as indicated by a thermocouple under a 0.40 inch asbestos pad shall be observed at intervals not greater than 5 minutes during the one-hour period of test.

(2) Data from these tests shall be analyzed to determine the thicknesses necessary to limit the average temperature rise on the unexposed surface to 250 degrees F. above the original temperature at the end of 15, 30, and 60 minutes.

(3) Excessive cracking, buckling, or disintegration may be considered cause for rejection.

(d) *Organic carbon content test.* (1) The organic carbon content shall be determined and shall not exceed 0.12 gram per cubic centimeter of the molded deck covering.

(e) *Spot check tests.* (1) Deck coverings are not inspected at regularly scheduled factory inspections; however, the cognizant Officer in Charge, Marine Inspection, may detail a marine inspector at any time to visit any place where deck coverings are manufactured to conduct any inspections or examinations deemed advisable and to select representative samples for further examination, inspection or tests. The marine inspector shall be admitted to any place where work is done on deck coverings or component materials.

(2) Manufacturers of approved deck coverings shall maintain quality control of materials used, manufacturing methods, and the finished product so as to meet the requirements of this specification, and any other conditions outlined on the certificate of approval, but the Coast Guard also reserves the right to make spot-check tests of approved deck coverings at any time on samples selected by a marine inspector at the place of manufacture or samples obtained from other sources in the field. The manufacturer will incur no expense for such tests, but the results shall be binding upon the approval of his product. The manufacturer will be advised in advance of the time of testing of the samples selected and may witness the tests if he so desires.

[CGFR 53-25, 18 FR 7874, Dec. 5, 1953, as amended by CGFR 61-15, 26 FR 9302, Sept. 30, 1961]

§ 164.006-5 Procedure for approval.

(a) If a manufacturer desires to have a deck covering approved, a request shall be presented to the Commandant of the Coast Guard, together with the following information:

(1) The trade name and designation of the deck covering.

(2) The range of thicknesses in which it is proposed to lay the deck covering together with any information the manufacturer may have as to maximum or minimum thicknesses.

(3) Description of method of attachment to or protection of the steel deck together with the trade name and des-

ignation of adhesive or protective coating if used.

(4) A sample of the molded deck covering at least 6 inches square and ¼ inch thick. This may or may not be attached to a backing material at the manufacturer's option.

(b) The material submitted will be examined and the manufacturer advised as to the number and thicknesses of samples to be submitted together with the estimated cost of the tests.

(c) If the deck covering is indicated as being suitable, the manufacturer shall then submit the following:

(1) Two samples of each thickness to be tested laid in the manner designated on a ¼" x 12" x 27" steel plate for the purpose of the smoke test and fire resistance and integrity test noted in § 164.006-4 (b) and (c).

(2) Sufficient bulk material (unmixed) to lay a sample one inch thick on an area of 12" x 27". If an adhesive or protective coating is used, a liberal sample shall be supplied.

(3) If the manufacturer desires to witness the tests, he should so indicate at this time.

(4) A commitment that he will reimburse the National Bureau of Standards for the cost of the tests when billed by them.

(d) The above material will be submitted to the National Bureau of Standards by the Coast Guard for testing. The tests noted in § 164.006-4 will be conducted and a report submitted to the Coast Guard.

(e) A copy of the test report will be forwarded to the manufacturer and he will be advised if his material is approved under this specification, and if approved, in what thicknesses it may be laid, and in what thicknesses it must be laid to meet the requirements for Class A-60 decks without the use of any other insulating material. If approved, this information will be published in the FEDERAL REGISTER.

[CGFR 53-25, 18 FR 7874, Dec. 5, 1953, as amended by CGFR 61-62, 27 FR 180, Jan. 6, 1962]

Subpart 164.007—Structural Insulations

SOURCE: CGFR 69-72, 34 FR 17498, Oct. 29, 1969, unless otherwise noted.

§ 164.007-1 Applicable specification and referenced material.

(a) *Specification.* The following specification of the issue in effect on the date of manufacture of the structural insulation shall form a part of the regulations of this subpart (see §§ 2.75-17 through 2.75-19 of Subchapter A (Procedures Applicable to the Public) of this chapter:

(1) Coast Guard specification:

Subpart 164.009 of this part, Incombustible Materials for Merchant Vessels.

(b) *Technical reference.* For guidance purposes the technical reference may be used, which is entitled American Society for Testing Materials Standard E-119. "Fire Tests of Building Construction and Materials", ASTM, 1916 Race Street, Philadelphia, Pa. 19103.

(c) *Copies on file.* A copy of the specification listed in paragraph (a) of this section shall be kept on file by the manufacturer, together with the certificate of approval and this specification. It is the manufacturer's responsibility to have the latest issue of the specification on hand together with the certificate of approval and approved plans when manufacturing under this specification subpart.

(1) The Coast Guard specification may be obtained from the Commandant (MMT), U.S. Coast Guard, Washington, D.C. 20591.

(Sec. 6(b)(1), 80 Stat. 937; 49 U.S.C. 1655 (b)(1); 49 CFR 1.4(a)(2))

§ 164.007-2 Purpose.

The purpose of this specification is to set forth tests necessary to measure the insulation value of structural insulation specimens under fire exposure conditions. The tests are not intended to measure the integrity of structural components of an assembly Insulation meeting this specification is adequate to limit the average temperature rise of a steel bulkhead to 139° C. (250° F.) at the end of a 60-minute standard fire test.

(Sec. 6(b)(1), 80 Stat. 937; 49 U.S.C. 1655 (b)(1); 49 CFR 1.4(a)(2))

§ 164.007-3 Conditions of approval.

(a) Structural insulation shall be of such quality as to successfully meet the requirements for an incombustible material as set forth in Subpart 164.009 of this part.

(b) Structural insulation shall be of such quality and thickness as to successfully pass all of the tests set forth in § 164.007-4, and the retests required by § 164.007-8.

(c) The product shall be so marked as to be readily identifiable to an inspector in the field. The marking shall include the Coast Guard approval number.

(Sec. 6(b)(1), 80 Stat. 937; 49 U.S.C. 1655 (b)(1); 49 CFR 1.4(a)(2))

§ 164.007-4 Testing procedure.

(a) *Tests.* All tests, including the retests, shall be conducted at the National Bureau of Standards or other laboratories designated by the Coast Guard.

(b) *Test of physical properties.* (1) Density measurement: The smallest sample for density measurements of solid materials shall be 30 cm x 30 cm (12" x 12") by the submitted thickness. Length and width measurements shall be made to the nearest 1 mm. (1/32"), thickness to the nearest 0.25 mm. (0.01"), allowance being made of any nonflatness of the major surfaces of the specimen. Measurements of dimensions of fibrous insulations shall be made to the nearest 1.5 mm. (1/16") on a nominal 30 cm. (12") cube assembled from sheets of thickness as received. The average of at least four measurements of each dimension shall be reported. The weight shall be determined with a scale or balance sensitive and accurate to 0.5 percent or less of the total weight. The dimensional and weight measurements shall not be made until the sample has been conditioned 1 week, or longer if required to reach constant weight, in an atmosphere at 23° ±1°C. (73° F.±2°) and 50 percent relative humidity.

(2) Transfer to a previously dried and weighed wide-mouth weighing bottle provided with a glass stopper. Remove the stopper and heat the bottle and sample at 105°±5° C. (221°±9°F.) for 4 hours. Insert the stopper, cool and weigh. Calculate the content of moisture and other volatiles as percent of the final dry weight of the sample.

(c) *Preparation of fire test specimens.* (1) The fire test specimens shall be conditioned to approximately constant weight with air being maintained at a relative humidity of 40 to 70 percent and a temperature of 15° to 25° C. (50° to 77° F.). After conditioning, but before testing, the temperature of the specimens shall not exceed 40° C, (104° F.).

(2) Representative samples of the structural insulation, of a thickness or thicknesses and density as specified in § 164.007-9(a)(5), shall be tested as part of an assembly which forms a portion of a vertical wall of a furnace. The assembly shall be at least 100 cm. x 150 cm. (40" x 60") in size. More than one sample may be tested, see § 164.007-7.

(3) The specimens shall be attached to a 5±0.3 mm. (3/16") thick steel plate and mounted in the furnace with the steel plate forming the exterior wall of the furnace. Any stiffening members on the steel plate shall be installed on the face not adjacent to the insulation. Spacer strips of asbestos cement board or similar material, up to 5 cm. (2") in width, shall be installed around the periphery of the panel. For fibrous insulations, the attachment to the steel plate shall be made by means of 5 mm. (0.19") diameter steel pins on 30 cm. (12") centers covered by 18-gage, 4 cm. (1½") mesh expanded metal. Alternate methods will be given consideration. For other materials, typical installation practice shall be used.

(d) *Furnace control.* (1) The furnace temperature shall be determined by at least four mineral insulated thermocouples having rapid response, and distributed so as to represent fairly the furnace temperature and to insure as uniform heating as possible. The thermocouples shall be arranged so that the hot junction is approximately 10 cm. from the nearest point of the specimen.

(2) The furnace temperature shall be continuously controlled so as to follow the standard time-temperature

curve within the accuracy specified in paragraph (d)(4) of this section.

(3) The standard time-temperature curve is defined by a smooth curve drawn through the following points:

At the beginning of the test, 20° C. (68° F.)
At the end of the first 5 minutes, 538° C. (1,000° F.).
At the end of the first 10 minutes, 704° C. (1,300° F.).
At the end of the first 30 minutes, 843° C. (1,550° F.).
At the end of the first 60 minutes, 927° C. (1,700° F.).

For a further definition of the time-temperature curve, see Appendix I of the ASTM Standard E-119, "Fire Tests of Building Construction and Materials".

(4) The accuracy of the furnace control shall be such that the area under the mean time-temperature curve is within 15 percent of the area under the standard time-temperature curve during the first 10 minutes of the test, within 10 percent during the first one-half hour, and within 5 percent for any period after the first one-half hour. At any time after the first 10 minutes of the test the mean furnace temperature shall not differ from the standard curve by more than 100° C. (180° F.). Consideration will be given to adjusting the results for variation of the furnace exposure from that prescribed. If corrections are made, they shall be in accordance with the procedures set forth in the ASTM E-119.

(e) *Temperature of unexposed surface.* For the unexposed surface temperature measurement a thermocouple of 0.5 mm. (0.020") diameter wires shall be soldered centrally with high temperature solder to one surface of a disc of copper 12 mm. in diameter and 0.2 mm. thick. The discs shall be covered with an oven-dry asbestos pad 50 mm. × 50 mm, and 4 mm. thick. The disc and the pad may be fixed to the surface of the steel plate by pins, tape, or a suitable adhesive. The asbestos pad shall have a density of approximately 1,000 kg./m.^{3} and thermal conductivity of 0.11 kcal/m/hr. × ° C. at 100° C. (212° F.).

(f) *Temperature observations.* (1) All observations shall be taken at intervals not exceeding 5 minutes. The surface temperature on the exterior side of the steel plate shall be measured by thermocouples located as follows:

(i) One thermocouple located approximately in the center of each quadrant of the steel plate (four thermocouples total).

(ii) One thermocouple close to the center of the steel plate.

(iii) One thermocouple in way of or as close as possible to one of the pins or other through metallic connections (if any) used for holding the insulation in place.

(iv) Further thermocouples at the discretion of the testing laboratory or Coast Guard for the purpose of determining the temperature at points deemed likely to give a greater temperature rise than any of the abovementioned thermocouples.

(2) The average temperature rise on the unexposed surface shall be obtained by averaging the readings of the thermocouples mentioned in paragraphs (f)(1)(i) and (ii) of this section.

(g) *Other observations.* Throughout the test observations shall be made of all changes and occurrences, which are not criteria of performance, but which may create hazard in case of a fire; for example the emission of appreciable volumes of smoke or noxious vapors from the unexposed side of the test specimen. The specimen shall be examined after the test for changes that have taken place and the information shall be noted in the test report.

(h) *Duration of testing.* The test shall be continued for at least one hour or until the maximum surface temperature rise values noted in § 164.007-5(a) have been reached, whichever occurs later.

(Sec. 6(b)(1), 80 Stat. 937; 49 U.S.C. 1655 (b)(1); 49 CFR 1.4(a)(2))

§ 164.007-5 Test requirements.

The insulation value of the specimens for the full scale test shall be such that the average temperature of the thermocouples on the unexposed surface described in § 164.007-4(f)(2) will not rise more than 139° C. (250°F.) above the initial temperature, nor will the temperature at any one point on the surface, including any through metallic connection, rise more than 181° C. (325° F.) above the original temperature at the end of 60 minutes. The results obtained on the small scale test 2′ x 2′ (60 cm. x 60 cm.) shall be recorded.

(Sec. 6(b)(1), 80 Stat. 937; 49 U.S.C. 1655 (b)(1); 49 CFR 1.4(a)(2))

§ 164.007-6. Test report.

(a) The test report required shall contain at least the following:

(1) Name of manufacturer.

(2) Purpose of test.

(3) Test conditions and date of test.

(4) Description of the panel tested giving the details of the assembly comprising a steel plate, insulation (thickness and density) spacer strips and fastening and the method of mounting the panel assembly in the test furnace.

(5) Complete time-temperature data, including initial temperature, for each thermocouple together with curves of average temperature for the unexposed surface of the insulation and the thermocouple recording the highest temperature. In addition, for § 164.007-9(g)(2), complete time-temperature data consisting of a numerical time-temperature table for each furnace and each surface of insulation thermocouple together with the initial temperature of each thermocouple.

(6) A log maintained by the owner relative to deflections, cracking or loosening of the insulation, smoke or gas emission, glow, flame emission, and any other important data. The time of each observation should be noted.

(7) Photographs of both sides of the panel before and after testing.

(8) Summary of test results.

(Sec. 6(b)(1), 80 Stat. 937; 49 U.S.C. 1655 (b)(1); 49 CFR 1.4(a)(2))

§ 164.007-7 Analysis of results.

(a) When only one sample is tested, the results of the test shall be binding and no analysis by the Coast Guard will be undertaken.

(b) When more than one sample of the same density material is tested simultaneously and the results are not exact, the Coast Guard may analyze the results. Data from the tests may be analyzed to determine the minimum thickness to meet the requirements of § 164.007-5(a).

(c) Consideration will be given to correction for inaccurate furnace control in accordance with § 164.007-4(d)(4).

(Sec. 6(b)(1), 80 Stat. 937; 49 U.S.C. 1655 (b)(1); 49 CFR 1.4(a)(2))

[CGFR 69-72, 34 FR 17498, Oct. 29, 1969; 34 FR 19030, Nov. 29, 1969]

§ 164.007-8 Retests.

(a) Manufacturers of approved structural insulation shall maintain quality control of materials used, manufacturing methods, and the finished product utilizing appropriate quality control testing so as to meet the requirements of this specification, and any other conditions outlined on the certificate of approval. Structural insulation materials are not inspected at regularly scheduled factory inspections; however, approved materials are subject to retest for continued compliance with the requirements of this subpart on the following basis:

(1) The Coast Guard may detail a marine inspector or other Coast Guard designated inspector at any time to visit any place where structural insulation is manufactured to conduct any inspections or examinations deemed advisable and to select representative samples for further examination, inspection, or tests. The inspector shall be admitted to any place where work is done on structural insulation or component materials.

(2) At a frequency of not less than once every 5 years following issuance of approval, samples of an approved material selected from production stock shall be forwarded by the inspector to the Commandant for testing in accordance with the requirements of this subpart. Where the plant is outside the jurisdiction of a Coast Guard District Commander, the frequency of such testing shall be once every 2 years. The cost of such testing shall be borne by the manufacturer. The nature of the product or its production may dictate a differing retest frequency.

(3) The Coast Guard reserves the right to make spot-check tests of approved structural insulation at any time on samples selected by a marine inspector obtained during installation

on a vessel. The manufacturer will incur no expense for such tests, but the results, shall be binding upon the approval of his product.

(b) A small scale furnace test (2′ x 2′ furnace test 60 cm. x 60 cm.) shall be conducted. The time of failure shall not vary from the original small scale test values by more than 10 percent. In addition tests shall be conducted to determine incombustibility (§ 164.009), density and thickness. Values of retesting for density and thickness shall not vary from the original test values by more than 10 percent.

(Sec. 6(b)(1), 80 Stat. 937; 49 U.S.C. 1655 (b)(1); 49 CFR 1.4(a)(2))

§ 164.007-9 Procedure for approval.

The following items shall be accomplished in sequential order.

(a) *Test request information.* If a manufacturer desires to have a structural insulation approved, a written request shall be submitted to the Commandant of the Coast Guard together with the following:

(1) If the material has already been approved as an incombustible material under Subpart 164.009 of this part, the approval number of the material shall be indicated. If not, the procedure set forth in Subpart 164.009 of this part shall be followed; and such approval shall be obtained prior to submittal under this specification.

(2) A description and trade name of the structural insulation.

(3) A statement of the composition of the material and the percentage of each component.

(4) A sample of the material at least 1 foot square in the thickness and density proposed by the manufacturer to be tested. When more than one thickness of a material of the same density is to be tested, only a sample of a single thickness need be submitted.

(5) The range of thicknesses and densities in which it is proposed to manufacture or use the material together with any information or recommendations that the manufacturer may have as to maximum or minimum thickness or density.

(6) The location of the place or places where the material will be manufactured.

(7) Description of attachment to or protection of the bulkhead or deck. If an adhesive is used, a liberal sample shall be supplied.

(8) A sketch showing typical installation methods and indicating limitations if any.

(9) A general statement describing manufacturing procedures indicating the degree of quality control exercised and the degree of inspection performed by outside organizations.

(10) A statement indicating proposed methods for field identification of the products as being approved. Identification shall include the Coast Guard approval numbers.

(b) *Test suitability.* The above information will be examined by the Coast Guard, and if it is indicated that the material is in all respects suitable for testing, the manufacturer will be so advised. Coast Guard comments on the manufacturer's recommended thickness and density of the sample or samples for the fire resistance test will be given at this time, together with the estimated cost of the required test.

(c) *Samples to be submitted.* If the material is indicated as being suitable for testing, the manufacturer shall submit a 100 cm. x 150 cm. (40″ x 60″) sample, a 30 cm. x 30 cm. (12″ x 12″) sample and a 60 cm. x 60cm. (24″ x 24″) sample for each thickness and density proposed to the Fire Research Section of the National Bureau of Standards, Washington, D.C. 20234, and shall advise the Coast Guard of the shipment. A separate test will be made for each density of the material for which approval is desired.

(d) *Pretest information.* At this time the manufacturer shall submit to the Coast Guard the following:

(1) A statement that the material is offered for testing as described pursuant to paragraph (a)(3) of this section is completely representative of the product which will be manufactured and sold under U.S. Coast Guard approval if such approval is granted and that the shipbuilder will be advised of the proper installation methods and the limitations of the approval.

(2) A commitment that he will reimburse the National Bureau of Standards for the cost or review of the tests when billed by them.

(3) If the manufacturer desires to witness the test, he should so indicate at this time.

(e) *Test authorization.* The National Bureau of Standards will then be authorized to conduct the tests noted in § 164.007-4 and, upon completion of all testing, the manufacturer will be billed directly by the National Bureau of Standards. Four copies of the test report containing the information required by § 164.007-6 will be submitted to the Coast Guard.

(f) *Notification of results.* A copy of the report will be forwarded to the manufacturer and he will be advised if his material is approved under this subpart. If approved, any stipulations of the approval will be specified. This information will be published in the FEDERAL REGISTER, and a certificate of approval will be issued to the manufacturer.

(g) *Other laboratories.* (1) If the manufacturer desires to have the test conducted at some laboratory other than the National Bureau of Standards, this information shall be supplied at the time of initial contact with the Coast Guard. If the proposed laboratory is acceptable to the Coast Guard, the manufacturer will be so advised, and any special testing requirements together with any estimated cost of expenses incurred by the National Bureau of Standards for their review will be specified at this time. The Coast Guard shall be notified in advance of the date of the test so that a representative may be present.

(2) The laboratory shall submit four copies of a detailed test report to the Coast Guard together with representative samples of the material taken before and after testing. The test report and samples will be examined by the National Bureau of Standards for compliance with this subpart. The test report shall include the information required by § 164.007-6 together with any other pertinent data.

(Sec. 6(b)(1), 80 Stat. 937; 49 U.S.C. 1655 (b)(1); 49 CFR 1.4(a)(2))

Subpart 164.008—Bulkhead Panels

SOURCE: CGFR 69-72, 34 FR 17500, Oct. 29, 1969, unless otherwise noted.

§ 164.008-1 Applicable specification and reference material.

(a) *Specification.* The following specification of the issue in effect on the date of manufacture of the bulkhead panel shall form a part of the regulations of this subpart (see §§ 2.75-17 through 2.75-19 of Subchapter A, Procedures Applicable to the Public, of this chapter):

(1) Coast Guard specification:

Subpart 164.009 of this part, Incombustible Materials for Merchant Vessels.

(b) *Technical reference.* For guidance purposes this technical reference may be used, which is entitled American Society for Testing Materials Standard E-119, "Fire Tests of Building Construction and Materials", ASTM, 1916 Race Street, Philadelphia, Pa. 19103.

(c) *Copies on file.* A copy of the specification listed in paragraph (a) of this section shall be kept on file by the manufacturer, together with the certificate of approval and this specification. It is the manufacturer's responsibility to have the latest issue of the specification on hand together with the certificate of approval and approved plans when manufacturing under this specification subpart.

(1) The Coast Guard specification may be obtained from the Commandant (MMT), U.S. Coast Guard, Washington, D.C. 20591.

(Sec. 6(b)(1), 80 Stat. 937; 49 U.S.C. 1655 (b)(1); 49 CFR 1.4(a)(2))

§ 164.008-2 Conditions of approval.

(a) Bulkhead panel material shall be of such quality as to successfully meet the requirements for an incombustible material as set forth in Subpart 164.009 of this part.

(b) Bulkhead panels used in Class B-15 construction and as a component in Class A-30 or Class A-15 construction shall meet the thermal insulation requirements of § 164.008-4(a) for at least 15 minutes, and the integrity requirements of § 164.008-4(b) for at least 30 minutes.

(c) Bulkhead panels for use as a component in Class A-60 construction shall meet the thermal insulation requirements of § 164.008-4(a) for at least 15 minutes and the integrity requirements of § 164.008-4(b) for at least 60 minutes.

(d) The product shall be so marked as to be readily identifiable to an inspector in the field. The marking shall include the Coast Guard approval number.

(e) The specimen to be tested shall be representative of the typical installation on board a vessel and any limitations shall be shown on the sketch required by § 164.008-7(a)(7).

(f) The bulkhead panel shall successfully pass the retests required by § 164.008-6.

(Sec. 6(b)(1), 80 Stat. 937; 49 U.S.C. 1655 (b)(1); 49 CFR 1.4(a)(2))

§ 164.008-3 Testing procedure.

(a) *Tests.* All tests, including the retests, shall be conducted at the National Bureau of Standards or other laboratories designated by the Coast Guard.

(b) *Preparation of test specimen.* (1) The test specimens shall be conditioned to approximately constant weight with the air being maintained at a relative humidity of 40 to 70 percent and a temperature of 15° to 25° C. (59° to 77° F.). After conditioning, but before testing, the temperature of the specimen should not exceed 40° C. (104° F.).

(2) The specimens shall be mounted in the furnace in a vertical position in such a way as to give an exposed surface of at least 4.65 square meters (50 square feet) and a height of at least 2.44 meters (8 feet).

(3) The specimen shall be supported at the top and secured on the vertical sides and at the bottom in a manner representative of conditions in service. If provision for movement at the edges of a bulkhead panel is made for a particular construction in service, the specimen should stimulate these conditions.

(4) The method of securing shall be such that there is no possibility of misinterpretation of test results due to the passage of flame at the edges of the specimen when the method of fixing is not the subject of the test.

(c) *Furnace control.* (1) The furnace temperature shall be determined by at least four mineral insulated thermocouples having rapid response and distributed so as to represent fairly the furnace temperature and to insure as uniform heating as possible. The thermocouples shall be arranged so that the hot junction is approximately 10 cm. (4") from the nearest point of the specimen.

(2) The furnace temperature shall be continuously controlled so as to follow the standard time-temperature curve within the accuracy specified in paragraph (c)(4) of this section.

(3) The standard time-temperature curve is defined by a smooth curve drawn through the following points:

At the beginning of the test, 20° C. (68° F.).
At the end of the first 5 minutes, 538° C. (1,000° F.).
At the end of the first 10 minutes, 704° C. (1,300° F.).
At the end of the first 30 minutes, 843° C. (1,550° F.).
At the end of the first 60 minutes, 927° C. (1,700° F.).

For a further definition of the time-temperature curve, see Appendix I of the ASTM Standard E119, "Fire Tests of Building Construction and Materials".

(4) The accuracy of the furnace control shall be such that the area under the mean time-temperature curve is within 15 percent of the area under the standard curve during the first 10 minutes of the test, within 10 percent during the first one-half hour, and within 5 percent for any period after the first one-half hour. At any time after the first 10 minutes of the test the mean furnace temperature shall not differ from the standard curve by more than 100° C. (180° F.). Consideration will be given to adjusting the results for variation of the furnace exposure from that prescribed. If corrections are made, they shall be in accordance with the procedures set forth in ASTM E-119.

(5) The pressure in the furnace shall be equal to that in the laboratory at about one-third of the height of the specimen.

(d) *Temperature of unexposed surface.* For the unexposed surface temperature measurement, a thermocouple of 0.5 mm. (0.020") diameter wires shall be soldered centrally with high temperature solder to one surface of a disc of copper 12 mm. diameter and 0.2

mm. thick. The discs shall be covered with an oven-dry asbestos pad 50 mm. x 50 mm. and 4 mm. thick. The disc and the pad may be fixed to the surface of the specimen by pins, tape or a suitable adhesive, depending on the nature of the specimen material. The asbestos pad shall have a density of approximately 1,000 kg./m.^{3} and thermal conductivity of 0.11 kcal./m./hr. x C. at 100° C. (212° F.).

(e) *Flame penetration.* (1) Where cracks or openings are formed during the test, an ignition test as prescribed in § 164.008-4(b) shall take place immediately after the appearance of cracks or damage, followed by similar tests at frequent intervals. The purpose of the test is to indicate whether cracks and openings formed during the test are such that they would lead to passage of flame.

(2) The cotton wool used for the tests prescribed in § 164.008-4(b) shall consist of new undyed soft fibers without any admixture of artificial fibers, and shall be free from thread, leaf, and shell fiber dust. A suitable material for this purpose is sold in the form of rolls for surgical use. A pad shall be cut measuring 10 cm. x 10 cm. approximately 2 cm. thick and weighing between 3 and 4 grams. It shall be oven-dried prior to the test. The pad shall be attached by means of wire clips to a 10 cm. x 10 cm. frame of 1 mm. diameter. A wire handle approximately 75 cm. long attached to the frame would facilitate its use on the specimen.

(3) When testing for cracks or openings during the test, the pad shall be held in a vertical position facing the crack or opening with the aperture located in a central part of the cotton wool. The pad may be reused if it has not absorbed any moisture or become charred during the previous application.

(f) *Temperature observations.* (1) All observations shall be taken at intervals not exceeding 5 minutes. The surface temperatures on the unexposed side of the test specimen shall be measured by thermocouples located as follows:

(i) One thermocouple located approximately in the center of each quadrant of the steel plate (four thermocouples total).

(ii) One thermocouple close to the center of the test specimen, but away from the joint, if any.

(iii) At least one thermocouple at the vertical joint of the test specimen.

(iv) Further thermocouples at the discretion of the testing laboratory or Coast Guard for the purpose of determining the temperature at points deemed likely to give a greater temperature rise than any of the above mentioned thermocouples.

(2) The average temperature rise on the unexposed surface shall be obtained by averaging the readings of the thermocouples mentioned in paragraphs (f)(1) (i) and (ii) of this section.

(g) *Other observations.* Throughout the test, observations shall be made of all changes and occurrences, which are not criteria of performance but which may create hazard in case of a fire; for example the emission of appreciable volumes of smoke or noxious vapors from the unexposed side of the test specimen. The specimen shall be examined after the test for changes that have taken place and the information shall be noted in the test report.

(h) *Duration of testing.* The test shall be continued for at least 30 minutes to meet the requirements of § 164.008-2(b) or at least 60 minutes to meet the requirements of § 164.008-2(c). In either case, the test shall be continued until the maximum surface temperature rise values noted in § 164.008-4(a) have been reached, or until cracks which lead to flaming as specified in § 164.008-4(b) are formed.

(Sec. 6(b)(1), 80 Stat. 937; 49 U.S.C. 1655 (b)(1); 49 CFR 1.4(a)(2))

§ 164.008-4 Test requirements.

(a) Thermal insulation: The insulation value of the specimens for the full scale test shall be such that the average temperature of thermocouples on the unexposed surface described in § 164.008-3(f)(2) will not rise more than 139° C. (250° F.) above the initial temperature, nor will the temperature at any point on the surface, including any joint, rise more than 225° C. (405° F.) above the initial temperature at the end of 15 minutes. When failure is due to excessive temperature rise on the joint, consideration will be given to alternate joint construction. The results obtained on the small scale test (2′ x 2′) (60 cm. x 60 cm.) shall be recorded.

(b) The test shall determine the length of time, up to one hour, that the bulkhead panel, including the joint can withstand the passage of flame. Cracks and openings shall not be such as to lead to flaming of a cotton wool test pad as prescribed in § 164.008-3(e)(3) held facing the aperture at about 25 mm. for a period of 30 seconds. If no flaming occurs, the pad shall be removed and reapplied after a suitable interval.

(Sec. 6(b)(1), 80 Stat. 937; 49 U.S.C. 1655 (b)(1); 49 CFR 1.4(a)(2))

§ 164.008-5 Test report.

(a) The test report required by § 164.008-7(e) and (g) shall include at least the following:

(1) Name of manufacturer.

(2) Purpose of test.

(3) Test conditions and date of test.

(4) Description of the panel tested giving size, thickness, density, detail of joint and method of assembling in test furnace.

(5) Complete time-temperature data, including initial temperature, for each thermocouple together with curves of average temperature for the unexposed surface of the insulation and the thermocouple recording the highest temperature. In addition, for § 164.008-7(g)(2) complete time-temperature data consisting of a numerical time-temperature table for each furnace and each surface of insulation thermocouple together with the initial temperature of each thermocouple.

(6) A log setting forth the observer's notes relative to deflections, smoke or gas emission, glow, flame emission, and any other important data. The time of each observation should be noted.

(7) Complete observations on the appearance of cracks and data on the testing of the cracks as specified in § 164.008-4(b).

(8) Photographs of both sides of the panel before and after testing.

(9) Summary of test results.

(Sec. 6(b)(1), 80 Stat. 937; 49 U.S.C. 1655 (b)(1); 49 CFR 1.4(a)(2))

[CGFR 69-72, 34 FR 17500, Oct. 29, 1969; 34 FR 19030, Nov. 29, 1969]

§ 164.008-6 Retests.

(a) Manufacturers of approved bulkhead panels shall maintain quality control of materials used, manufacturing methods, and the finished product utilizing appropriate quality control testing so as to meet the requirements of this specification, and any other conditions outlined on the certificate of approval. Bulkhead panels are not inspected at regularly scheduled factory inspections; however, approved bulkhead panels are subject to retest for continued compliance with the requirements of this subpart on the following basis:

(1) The Coast Guard may detail a marine inspector or other Coast Guard designated inspector at any time to visit any place where bulkhead panels are manufactured to conduct any inspections or examinations deemed advisable and to select representative samples for further examination, inspection, or tests. The inspector shall be admitted to any place where work is done on bulkhead panels or component materials.

(2) At a frequency of not less than once every 5 years following issuance of approval, samples of an approved bulkhead panel selected from production stock shall be forwarded by the inspector to the Commandant for testing in accordance with the requirements of this subpart. Where the plant is outside the jurisdiction of a Coast Guard District Commander, the frequency of such selection and testing shall be every 2 years. The cost of such testing shall be borne by the manufacturer. The nature of the product or its production may dictate a differing retest frequency.

(3) The Coast Guard reserves the right to make spot-check tests of approved bulkhead panels at any time on samples selected by a marine inspector obtained during installation on a vessel. The manufacturer will incur no expense for such tests, but the results shall be binding upon the approval of his product.

(b) A small scale furnace test (2′ x 2′ furnace test) shall be conducted. The time of failure shall not vary from the original (2′ x 2′ furnace) test values by more than 10 percent. In addition, tests shall be conducted to determine incombustibility (§ 164.009), density and thickness. Values on retesting for density and thickness shall not vary from the original test values by more than 10 percent.

(Sec. 6(b)(1), 80 Stat. 937; 49 U.S.C. 1655 (b)(1); 49 CFR 1.4(a)(2))

§ 164.008-7 Procedure for approval.

The following items shall be accomplished in sequential order.

(a) *Test request information.* If a manufacturer desires to have a bulkhead panel approved, a written request shall be submitted to the Commandant of the Coast Guard, together with the following:

(1) If the material has already been approved as an "Incombustible Material" under Subpart 164.009 of this part, the approval number of the material shall be indicated. If not, the procedure set forth in Subpart 164.009 of this part shall be followed; and such approval shall be obtained prior to submittal under this specification.

(2) The description and trade name of the bulkhead panel.

(3) A statement of the composition of the material and the percentage of each component.

(4) A sample of the material at least 1 foot square in each thickness and density of the material as manufactured.

(5) The range of thicknesses and/or densities in which it is proposed to manufacture or use the material, together with any information or recommendations the manufacturer may have as maximum or minimum thickness or density.

(6) The location of the place or places where the material will be manufactured.

(7) A sketch showing typical installation methods and indicating limtations, if any.

(8) A general statement describing manufacturing procedures indicating the degree of quality control exercised and the degree of inspection performed by outside organizations.

(9) A statement indicating proposed methods for field identification of the products as being approved. Identification shall include the Coast Guard approval number.

(b) *Test suitability.* The above information will be examined by the Coast Guard and if it is indicated that the material is in all other respects suitable for testing, the manufacturer will be so advised. Coast Guard comments on the manufacturer's recommended thickness and density of the panel for the fire resistance and integrity test will be given at this time together with the estimated cost of the tests.

(c) *Samples to be submitted.* If the material is indicated as being suitable for testing, the manufacturer shall submit the samples required by paragraph (c)(1) of this section to the Fire Research Section of the National Bureau of Standards, Washington, D.C. 20234, and shall advise the Coast Guard of the shipment.

(1) One representative panel of the material having a surface approximately 4.65 square meters (50 square feet) and a height of 2.44 meters (8 feet) containing at least one vertical joint, located at approximately one-third panel width from one edge (20-24 inches), and one representative panel of the material having 60 cm. x 60 cm. (2′ x 2′) dimensions. If the manufacturer desires to submit the panel in thickness or size other than that recommended, prior approval shall be obtained from the Commandant. The manufacturer shall supply any labor required for fabrication of the panel and for attaching the panel to the frame for testing.

(d) *Pretest information.* At this time the manufacturer shall submit to the Coast Guard the following:

(1) A statement that the material as offered for testing and as described pursuant to § 164.008-6(a)(3) is completely representative of the product which will be manufactured and sold under U.S. Coast Guard approval if such approval is granted and that the shipbuilder will be advised of the proper installation methods and the limitations of the conditions of approval.

(2) A commitment from the manufacturer that he will reimburse the National Bureau of Standards for the cost of the tests or review when billed by them.

(3) If the manufacturer desires to witness the test, he should so indicate at this time.

(e) *Test authorization.* The National Bureau of Standards will then be authorized to conduct the test noted in § 164.008-4(a) and, upon completion of all testing, the manufacturer will be billed directly by the National Bureau of Standards, four copies of the report containing the information required by § 164.008-5 shall be submitted to the Coast Guard.

(f) *Notification of results.* A copy of the report will be forwarded to the manufacturer, and he will be advised if his material is approved under this subpart. If approved, any stipulations of the approval will be specified. This information will be published in the FEDERAL REGISTER, and a certificate of approval will be issued to the manufacturer.

(g) *Other laboratories.* (1) If the manufacturer desires to have the tests conducted at some laboratory other than the National Bureau of Standards, this information shall be supplied at the time of initial contact with the Coast Guard. If the proposed laboratory is acceptable to the Coast Guard, the manufacturer will be so advised and any special testing requirements together with an estimated cost of expenses incurred by the National Bureau of Standards for their review will be specified at this time. Payment will be made as noted in paragraph (d)(2) of this section. The Coast Guard shall be notified in advance of the date of the test so that a representative may be present.

(2) The laboratory shall submit four copies of a detailed test report to the Coast Guard, together with representative samples of the material being taken before and after testing. The test report and samples will be examined by the National Bureau of Standards for compliance with this subpart. The test report shall include the information required by § 164.008-5 together with any other pertinent data.

(Sec. 6(b)(1), 80 Stat. 937; 49 U.S.C. 1655 (b)(1); 49 CFR 1.4(a)(2))

Subpart 164.009—Noncombustible Materials for Merchant Vessels

AUTHORITY: R.S. 4405, as amended (46 USC 375), sec. 3, 70 Stat. 152 (46 USC 390b), R.S. 4417a, as amended (46 USC 391a), R.S. 4462, as amended (46 USC 416), R.S. 4488, as amended (46 USC 481), sec. 6(b)(1), 80 Stat. 937 (49 USC 1655(b)(1)); E.O. 11239, 30 FR 1964-65 Comp., p. 334; 49 CFR 1.46(b).

SOURCE: CGD 74-129, 41 FR 41701, Sept. 23, 1976, unless otherwise noted.

§ 164.009-1 General.

(a) This subpart contains—

(1) procedures for approval of noncombustible materials used in merchant vessel construction;

(2) the test and measurements required for approval of materials; and

(3) a list of noncombustible materials for which specific approval under this subpart is not required.

(b) The test and measurements described in this subpart are conducted by a laboratory designated by the Commandant. The laboratory designated for this purpose is the National Bureau of Standards, Washington, D.C. 20234.

§ 164.009-3 Applicable documents.

(a) References to the following documents are made in this subpart.

(1) *Federal Specification:* HH-M-351D Millboard, Asbestos, dated November 18, 1968, as amended on April 27, 1972.

(2) *ASTM Standard:* D-1571-73, Specification for Woven Asbestos Cloth, published in August, 1973.

(b) Federal Specification HH-M-351D may be purchased from the Business Service Center, General Services Administration, Washington, D.C. 20407. ASTM Standard D-1571-73 may be purchased from the American Society for Testing Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.

§ 164.009-5 Noncombustible materials not requiring specific approval.

The following noncombustible materials may be used in merchant vessel construction though not specifically approved under this subpart:

(a) Sheet glass, block glass, clay, ceramics, and uncoated glass fibers.

(b) All metals, except magnesium and magnesium alloys.

(c) Portland cement, gypsum, and magnesite concretes having aggregates of sand, gravel, asbestos fibers, expanded vermiculite, expanded or vesicular slags, diatomaceous silica, perlite, or pumice.

(d) Asbestos millboard meeting the requirements of Federal Specification HH-M-351D.

(e) Woven asbestos cloth meeting the requirements for Grade AAA or AAAA asbestos in ASTM Standard D-1571-73.

(f) Woven, knitted, or needle punched glass fabric containing not more than 2.5 percent lubricant.

§ 164.009-7 Contents of application.

An application for approval of a material under this subpart must contain the following:

(a) The trade name of the material.

(b) The thickness or density, or both, of the material, or the range of thicknesses or densities, or both, of the material as manufactured.

(c) The composition of the material.

(d) The density and percentage of moisture and volatile matter of each component of the material.

(e) The address of the factory manufacturing the material.

(f) A sample representative of the material that is 305 mm long and 305 mm wide and that has a height equal to the largest thickness of the material as manufactured.

(g) If the applicant intends to observe the test and measurements of the sample, a statement to that effect.

(h) A commitment by the applicant to pay for the cost of the test and measurements when billed by the designated laboratory.

§ 164.009-9 Procedure for approval.

(a) An application for approval of a material under this subpart must be sent to the Chief, Merchant Marine Technical Division, whose address is Commandant (G-MMT-3/83), U.S. Coast Guard, Washington, D.C. 20593.

(b) The application is examined by the Coast Guard to determine the probability that the material meets the requirements for approval. The Coast Guard notifies the applicant of the results of the examination and of the sample size necessary for submission to the designated laboratory.

(c) The designated laboratory notifies the applicant of the time and place for submission and testing of the sample.

(d) The designated laboratory conducts the tests and measurements of the sample in accordance with the procedures in this subpart, prepares a test report, and sends four copies of the report to the Chief, Merchant Marine Technical Division. The applicant may observe the test and measurements.

(e) The Chief, Merchant Marine Technical Division, sends a copy of the test report to the applicant and advises him whether the material is approved. If the material is approved, an approval certificate is sent to the applicant.

§ 164.009-11 Furnace apparatus.

(a) The test furnace apparatus consists of a furnace tube, stabilizer, draft shield, furnace stand, temperature coil controls with a voltage stabilizer, specimen holder, specimen insertion device, and three thermocouples (a furnace thermocouple to measure furnace temperature, a surface thermocouple to measure temperature at the surface of a specimen, and a specimen thermocouple to measure temperature at the center of a specimen). A detailed plan of the construction and arrangement of the furnace apparatus may be obtained from the Chief, Merchant Marine Technical Division.

(b) Temperatures measured by the thermocouples are recorded by an instrument having a measuring range that corresponds to the temperature changes that occur during a furnace calibration or test. The temperature recording equipment is accurate to within at least 0.5 percent of temperatures recorded during a test.

§ 164.009-13 Furnace calibration.

A calibration is performed on each new furnace and on each existing furnace as often as necessary to ensure that the furnace is in good working order. In each calibration the energy input to the furnace is adjusted so that the furnace thermocouple gives a steady reading of 750±10°C. The wall temperature of the furnace tube is then measured by an optical micropyrometer at intervals of 10mm on 3 equally spaced vertical axes. The furnace is correctly calibrated if the temperature of the furnace tube wall is between 825 and 875° C 50 mm above and below the midline of the wall and if the average wall temperature is approximately 850° C.

§ 164.009-15 Test procedure.

(a) *General.* Paragraphs (b) through (k) of this section contain the test procedures for each material submitted for approval, except fiberglass and other materials that melt at 750°±10°C. Paragraph (*1*) of this section contains test procedures for fiberglass and other materials that melt at 750°±10°C.

(b) *Preparation of specimens.* (1) The designated laboratory prepares 5 cylindrical specimens representative of the properties of the sample submitted for testing. The dimensions of each specimen are as follows:

diameter: 45(+2/−0) mm
height: 50±3 mm
volume: 80±5 cm ^{3}

(2) If the height of the sample, except a composite material, is less than 47 mm, the specimens prepared consist of layers of the sample.

(3) If the sample is a composite material and has a height that is not 50±3mm, the layers of the specimen prepared are proportional in thickness to the layers of the sample.

(4) The top and bottom faces of each specimen prepared are the faces of the material as manufactured.

(5) If it is not practicable to prepare a specimen by the procedures described in paragraphs (b)(2) through (b)(4) of this section, the test is performed on five specimens of each component of the sample made to the dimensions prescribed in paragraph (b)(1) of this section.

(c) *Conditioning of specimen.* Each specimen is conditioned for at least 20 hours in a ventilated oven maintained at 60±5° C and is then cooled to room temperature in a desiccator.

(d) *Weight of specimen.* The weight of each conditioned specimen after cooling is determined before it is tested.

(e) *Placement of specimen in holder.* After a specimen is conditioned and weighed, it is placed in the specimen holder. A specimen that is made of layers of a composite material is held firmly together in the specimen holder.

(f) *Attachment of thermocouples.* After the specimen is placed in the specimen holder, the thermocouples are attached to the specimen as follows: A vertical hole with a diameter of 2 mm and a depth that is half the height of the specimen is made in the center of the top of the specimen. The specimen thermocouple is then inserted into the hole so that its hot junction is at the center of the specimen. The surface thermocouple is put in contact with the surface of the specimen at its mid-height.

(g) *Preparation of the apparatus.* The apparatus is examined to determine whether it is in good working order and to ensure that the equipment is protected against drafts and is not exposed to direct sunlight or artificial illumination. The furnace temperature is stabilized at 750° C±10°C and kept at that temperature for the duration of the test. The furnace temperature is stabilized when no adjustments are needed in the energy input to the furnace to keep the temperature constant.

(h) *Insertion of specimen.* After the furnace temperature is stabilized for at least 10 minutes, the specimen is inserted into the furnace. The insertion is completed within 5 seconds. The specimen is positioned so that the hot junction of the surface thermocouple is diametrically opposite the hot junction of the furnace thermocouple.

(i) *Heating period.* The heating period begins upon insertion of the specimen into the furnace and continues for 20 minutes, or until peak temperatures have passed.

(j) *Test observations.* Temperature measurements at each thermocouple are made at intervals of not more than 10 seconds during the heating period, and note is taken of the occurrence and duration of any flaming. At the end of the heating period, the specimen is removed from the furnace and weighed while still hot.

(k) *Test results.* Material is approved under this subpart if the test results of the sample submitted are within the following limits:

(1) The highest temperature recorded for each specimen during the test by the furnace thermocouple, when averaged with the highest temperatures recorded for the other specimens, is not more than 50° C above the stabilized furnace temperature.

(2) The highest temperature recorded for each specimen during the test by the surface thermocouple, when averaged with the highest temperatures recorded for the other specimens, is not more than 50° C above the stabilized furnace temperature.

(3) The duration of flaming of each specimen during the test, when averaged with duration of flaming recorded for the other specimens, is not more than 10 seconds.

(4) The average weight loss of the specimens after heating is not more than 50 percent of their average weight after conditioning.

(l) *Fiberglass and other materials that melt at 750° C+10° C.* If the material submitted for approval is fiberglass or other material that melts at 750°±10°C, it is tested as described in paragraphs (b) through (k) of this section, except the average weight loss of the sample is determined as follows:

(1) Five cylindrical specimens in addition to the five cylindrical specimens required in paragraph (b) of this section are prepared as described in paragraph (b) of this section.

(2) Each of the additional specimens is placed on a weighing dish and both the specimen and the weighing dish are conditioned as described in paragraph (c) of this section.

(3) The weight of each specimen and its weighing dish is determined as described in paragraph (d) of this section.

(4) After a specimen and weighing dish are conditioned and weighed, they are placed in the specimen holder with the specimen supported by weighing dish. No specimen thermocouple or surface thermocouple is attached to the specimen.

(5) The apparatus is prepared as described in paragraph (g) of this section, and after the furnace temperature has stabilized for at least 10 minutes, the specimen and weighing dish are inserted into the furnace. The specimen and weighing dish are then heated for 20 minutes or until peak temperatures have passed. At the end of the heating period, the specimen and weighing dish are removed from the furnace and weighed while still hot.

(6) The average weight loss of the specimens after heating may not be more than 50 percent of their average weight before heating.

§ 164.009–17 Density measurement.

(a) The measurements described in this section are made to determine the density of a sample.

(b) If the sample is a solid material, a specimen that has a length of 305 mm, a width of 305 mm, and thickness equal to that of the sample is prepared. The length and width are measured to the nearest 0.80 mm and the thickness to the nearest 0.25 mm. Allowance is made for any irregularity in the surfaces of the specimen. The average of at least four measurements of each dimension is determined.

(c) If the sample is fibrous insulation, a specimen is prepared from sheets of the sample submitted. The sample is a cube and each dimension is 305 mm±1.60 mm. The average of at least four measurements of each dimension is determined.

(d) The weight of a specimen is determined with a sensitive balance scale accurate to at least 0.5 percent of the weight of the specimen.

(e) The dimension and weight measurements of a specimen are made after it has been conditioned for at least one week, and for any additional time needed for the specimen to reach a constant weight, in an atmosphere that is 22.8°±2° C and 50 percent ±5 percent relative humidity.

§ 164.009–19 Measurement of moisture and volatile matter content.

(a) The measurements described in this section are made to determine the moisture and volatile matter content of a sample.

(b) A specimen cut from the density specimen of a sample is conditioned for at least one week, and for any additional time needed for the specimen to reach a constant weight, in an atmosphere that is 22.8° C±2° C, and 50 percent ±5 percent relative humidity. The conditioned specimen is then weighed and transferred to a previously weighed wide mouth weighing bottle that has a glass stopper. With the stopper removed, the bottle, stopper, and specimen are heated at 105°±5° C for four hours. After four hours, the stopper is inserted in the bottle and the bottle and sample are cooled and weighed.

(c) The content of moisture and volatile matter is the difference between the two weighings and is reported as a percentage of the weight of the conditioned specimen.

§ 164.009-21 Laboratory report.

The laboratory report of the test and measurements of a material contains the following:

(a) Name of the designated laboratory.

(b) Name of manufacturer of the material.

(c) Date of receipt of the material and dates of the test and measurements.

(d) Trade name of the material.

(e) Description of the material.

(f) Density of the sample.

(g) Percentage of moisture and volatile matter in the sample.

(h) Description of the specimens tested if the specimens are prepared from composite material.

(i) If the test was done on individual components of the sample, a description of the components.

(j) Test results including the following:

(1) Complete time and temperature data for each thermocouple.

(2) Each observation of flame emission and the time and duration of each emission.

§ 164.009-23 Factory inspection.

The Coast Guard does not inspect noncombustible materials approved under this subpart on a regular schedule. However, the Commander of the Coast Guard District in which a factory is located may detail a marine inspector at any time to visit a factory where a noncombustible material is manufactured to conduct an inspection of the manufacturing and quality control procedures and to select representative samples of the material for examination or tests to verify that the material is as stated in the original application for approval. The manufacturer is advised in advance of the time of testing samples selected and may witness the tests upon request.

§ 164.009-25 Marking.

The manufacturer must mark each shipping container for an approved noncombustible material with the approval number and date of approval of the material.

Subpart 164.012—Interior Finishes for Merchant Vessels

AUTHORITY: R.S. 4417, as amended, 4417a, as amended, 4418, as amended, 4426, as amended, 4488, as amended, sec. 5, 49 Stat. 1384, as amended, secs. 1, 2, 49 Stat. 1544, 1545, as amended, sec. 3, 54 Stat. 347, as amended, sec. 3, 70 Stat. 152, sec. 3, 68 Stat. 675; 46 U.S.C. 391, 391a, 392, 404, 481, 489, 367, 1333, 390b, 50 U.S.C. 198; E.O. 11239; Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-14, Nov. 26, 1954, 19 FR 8026; 167-20, June 18, 1956, 21 FR 4894; CGFR 56-28, July 24, 1956, 21 FR 5659; 167-38, Oct. 26, 1959, 24 FR 8857.

SOURCE: CGFR 61-15, 26 FR 9303, Sept. 30, 1961, unless otherwise noted.

§ 164.012-1 Applicable specifications.

(a) The following specifications, of the issue in effect on the contract date for the particular installation on any vessel, form a part of this subpart:

(1) American Society for Testing Materials' standard: E 84-50T—Tentative Method of Fire Hazard Classification for Building Materials.

(2) National Fire Protection Association's standard: NFPA No. 255—Method of Test of Surface Burning Characteristics of Building Materials.

(3) Coast Guard specifications: 164.008—Bulkhead Panels for Merchant Vessels. 164.009—Incombustible Materials for Merchant Vessels.

(b) A copy of this subpart, together with copies of the specifications referred to in this section, shall be kept on file by the manufacturer of any Interior Finish except those qualifying under § 164.012-5(c). It should be noted that the standards listed in paragraphs (a) (1) and (2) of this section are identical and, therefore, only one need to be kept on file. The Coast Guard specifications may be obtained upon request from the Commandant, U.S. Coast Guard Headquarters, Washington, D.C. 20226. The American Society for Testing Materials Standards may be purchased from that society at 1916 Race Street, Philadelphia, Pa., 19103. The National Fire Protection Association Standard may be purchased from that association at 60 Batterymarch Street, Boston, Mass., 02110.

[CGFR 61-15, 26 FR 9303, Sept. 30, 1961, as amended by CGFR 65-16, 30 FR 10903, Aug. 21, 1965]

§ 164.012-5 Scope.

(a) The purpose of this specification is to set forth the fire protection standards for "Interior Finishes" applied to "Bulkhead Panels" or "Incombustible Materials" approved under Subpart 164.008 or 164.009 of this subchapter. The term "Interior Finish" means any coating, overlay, or veneer except standard paint which is applied for decorative or other purpose. It includes not only the visible finish, but all material used in its composition and in its application to the approved "Bulkhead Panel" or "Incombustible Material." When finishes are applied to both sides of a panel, each must comply with this specification.

(b) "Interior Finishes" of not more than 0.075" thickness qualifying under § 164.012-10 and those materials which are described in paragraph (c) of this section, may be used without restriction on all merchant vessels, including those locations where combustible veneers, trim, moldings, and decorations are specifically prohibited by Subpart 72.05 of Subchapter H (Rules and Regulations for Passenger Vessels) of this chapter.

(c) With the exception of nitrocellulose or other highly inflammable or noxious fume-producing paints or lacquers (which are prohibited), a limited number of coats of any standard paint, or any "Incombustible Material" approved under Subpart 164.009 of this subchapter in any thickness, or a combination thereof, are considered as automatically satisfying the intent of this specification and no test or proof of compliance will be required. Paint may be applied to one or both sides of "Bulkhead Panels" or "Incombustible Materials," but it shall never be applied as an internal layer in sandwich or laminar construction.

§ 164.012-10 Requirements.

(a) For an "Interior Finish" to qualify under this specification it shall not be more than 0.075 inch thick (including adhesive and any underlayment) and shall be subjected to the test described in either standard listed in § 164.012-1(a) (1) or (2). The "Interior Finish" shall be applied to a ¼-inch asbestos cement board, "Bulkhead Panel" or "Incombustible Material" approved under Subparts 164.008 and 164.009, in the same manner as will be employed for the shipboard installation. The classification ratings determined by this test shall not exceed the following values:

Flame spread classification	20
Smoke classification	10

[CGFR 70-143, 35 FR 19967, Dec. 30, 1970]

§ 164.012-11 Marking.

In addition to that information required by the recognized laboratory, the following information and special markings shall be included:

> Complies with USCG Subpart 164.012. Approval No. 164.012/—.

[CGFR 70-143, 35 FR 19967, Dec. 30, 1970]

§ 164.012-12 Recognized laboratory.

A recognized laboratory is one which is operated as a nonprofit public service and is regularly engaged in the examination, testing, and evaluation as to the safety of insulation and surfacing materials; which has an established factory inspection, listing, and labeling program; and which has standards for evaluating listing and labeling which are acceptable to the Commandant. The following laboratories are recognized:

Underwriters' Laboratories, Inc.
207 East Ohio Street
Chicago, IL 60611

[CGFR 70-143, 35 FR 19967, Dec. 30, 1970]

§ 164.012-13 Examinations, tests, and inspections.

(a) *Manufacturer's inspection and tests.* Manufacturers of listed and labeled Interior Finishes shall maintain quality control of the materials used, manufacturing methods and the finished product so as to meet the applicable requirements, and shall make sufficient inspections and tests of representative samples and components produced to maintain the quality of the finished product. Records of tests conducted by the manufacturer and records of materials, including affidavits by suppliers that applicable requirements are met, entering into manufacture shall be made available to the recognized laboratory inspector or the Coast Guard marine inspector, or both, for review upon request.

(b) *Laboratory inspection and tests.* Such examinations, inspections and tests as are required by the recognized laboratory for listed and labeled material produced will be conducted by the laboratory inspector at the place of manufacture or other location at the option of the laboratory.

(c) *Test facilities.* The laboratory inspector, or the Coast Guard marine inspector assigned by the Commander of the District in which the factory is located, or both, shall be admitted to any place in the factory where work is being done on listed and labeled products, and either or both inspectors may take samples of parts or materials entering into construction of final assemblies, for further examinations, inspections, or tests. The manufacturer shall provide a suitable place and the apparatus necessary for the performance of the tests which are done at the place of manufacture.

(d) *Additional tests, etc.* Unannounced examinations, tests, and inspections of samples obtained either directly from the manufacturer or through commercial channels may be made to determine the suitability of a product for listing and labeling, or to determine conformance of a labeled product to the applicable requirements. These may be conducted by the recognized laboratory or the U.S. Coast Guard.

[CGFR 70-143, 35 FR 19967, Dec. 30, 1970]

§ 164.012-14 Procedure for listing and labeling.

(a) Manufacturers having a surfacing material which they consider has characteristics suitable for general use on merchant vessels may make application for listing and labeling as an interior finish by addressing a request directly to a recognized laboratory. The laboratory will inform the submitter as to the requirements for inspection, examinations, and testing necessary for such listing and labeling. The request shall include a permission for the laboratory to furnish a complete test report together with a description of the quality control procedures to the Commandant, U.S. Coast Guard.

(b) The U.S. Coast Guard will review the test report and quality control procedures to determine if the approval requirements have been met. If this is the case, the Commandant will notify the laboratory that the material is approved and that when the material is listed and labeled it may be marked as being U.S. Coast Guard approved. Notice of U.S. Coast Guard approval will be published in CG-190.

(c) If disagreements concerning procedural, technical or inspection questions arise over U.S. Coast Guard approval requirements the opinion of the Commandant shall be requested by the laboratory.

(d) The manufacturer may at any time request clarification or advice from the Commandant on any question which may arise regarding manufacturing and approval of approved devices.

[CGFR 70-143, 35 FR 19967, Dec. 30, 1970]

§ 164.012-15 Termination of listing and labeling.

(a) Listing and labeling as an interior finish acceptable to the Commandant as approved may be terminated, withdrawn, canceled, or suspended by written notice to the recognized laboratory from the Commandant, or by written notice to the manufacturer from the recognized laboratory or from the Commandant.

(b) The condition which may be the cause for termination of listing and labeling may be any of the following:

(1) When the manufacturer does not desire to retain the service.

(2) When the listed product is no longer being manufactured.

(3) When manufacturer's own program does not provide suitable assurance of the quality of the listed and labeled product being manufactured.

(4) When the product manufactured no longer conforms to the current applicable requirements of the U.S. Coast Guard and the recognized laboratory.

(5) When service experience or laboratory or U.S. Coast Guard reports indicate a product is unsatisfactory.

[CGFR 70-143, 35 FR 19967, Dec. 30, 1970]

Subpart 164.013—Foam, Unicellular Polyethylene (Buoyant, Slab, Slitted Trigonal Pattern)

AUTHORITY: R.S. 4405, as amended, 4462, as amended; 46 U.S.C. 375, 416. Interpret or apply secs. 6, 17, 54 Stat. 164, as amended, 166, as amended; 46 U.S.C. 526e, 526p. Treasury Department Order 120, July 31, 1950, 15 FR 6521.

§ 164.013-1 Applicable specifications and plans.

(a) *Specifications and plan.* The following specifications and plan, of the issue in effect on the date the plastic foam material is manufactured, form a part of this subpart:

(1) Federal test method standard.

No. 601—Rubber: Sampling and Testing.

(2) Military specification.

MIL-P-40619—Plastic Material, Cellular, Polystyrene.

(3) A.S.T.M. specification standard.

D-1564—Sections 42 to 46: Density Determination.

(4) Plan.

Dwg. 164.013-1—Pattern, Trigonal Slit, for Polyethylene Foam Slab Material.

(b) *Copies on file.* Copies of the specifications and plans referred to in this section shall be kept on file by the manufacturer together with the Certificate of Approval.

(1) The Coast Guard specifications and plans may be obtained upon request from the Commandant, United States Coast Guard, Washington, D.C. 20226.

(2) The federal testing method standards may be purchased from the Business Service Center, General Services Administration, Washington, D.C. 20407.

(3) The military specifications may be obtained from the Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue Philadelphia, Pa. 19120.

(4) The A.S.T.M. specification standards may be purchased from the American Society for Testing Materials, 1916 Race Street, Philadelphia, Pa. 19103.

[CGFR 64-19, 29 FR 7360, June 5, 1964, as amended by CGFR 65-16, 30 FR 10903, Aug. 21, 1965]

§ 164.013-2 Grades.

(a) Unicellular polyethylene foam shall be of but one grade as specified in this subpart.

[CGFR 64-19, 29 FR 7360, June 5, 1964]

§ 164.013-3 Material and workmanship.

(a) The unicellular polyethylene foam shall be all new material complying with the requirements outlined in this specification. The results of the tests described in § 164.013-4 shall yield property values within the limits shown in table in § 164.013-4(a).

(b) The manufacturer of the unicellular polyethylene foam shall incorporate a color throughout the material to provide identification. The choice of this color shall be subject to Coast Guard acceptance as a means of identifying the various manufacturers.

(c) The unicellular polyethylene foam shall be produced in slabs with a thickness of 1⅛"(+⅛", −0"). One surface of the foam sheet shall be slitted with the trigonal pattern shown on Dwg. No. 164.013-1. The slits of the trigonal pattern shall be cut to a depth that leaves an unslit portion of material ⅛"(+1/16", −0") in thickness.

The width of the slits shall be 0.000" to 0.035".

[CGFR 64-19, 29 FR 7360, June 5, 1964]

§ 164.013-4 Inspections and tests.

(a) *General.* Unicellular polyethylene foam to be used in a finished product subject to inspection by the Coast Guard shall also be subject to inspection at the plant where the foam is manufactured. The manufacturer of the foam has primary responsibility for quality control over the production of the foam. A marine inspector shall be admitted to any place in the factory where production or partial processing of the foam takes place, and he may take samples of the foam or other materials for further inspections or tests. The manufacturer shall provide a suitable place and the apparatus necessary for the performance of certain tests to be witnessed by the marine inspector, the results of which shall comply with the table in this paragraph. The following properties shall be determined on specimens of the sheet foam which have not been finished with the trigonal pattern slits described in § 164.013-3(c):

TABLE 164.013-4(a)—PROPERTY VALUES OF UNICELLULAR POLYETHYLENE FOAM

Property	Test reference	Value
Density, pounds per cubic foot.	ASTM D 1564, sections 42 to 46.	1.9 to 2.6.
Compression Deflection at 10%, psi (maximum).	Method 12151 of Fed. Std. Test Method No. 601.	8.0.
Water absorption, lbs. per square foot of cut surface (maximum).	MIL-P-40619, para. 4.5.7.	0.08.
Buoyancy in fresh water, lbs. per cubic foot (minimum).	§ 164.013-4(e)	55.
Volume loss on heat aging, percent (maximum).	MIL-P-40619, para. 4.5.9.	3.0.
Oil resistance	MIL-P-40619, para. 4.5.10.	No softening or swelling.
Odor at room temperature.	§ 164.013-4(g)	Not objectionable.
Compression set, percent of original thickness (maximum).	§ 164.013-4(j)	10.0

(b) *Density.* The density of the material shall be determined from specimens of sheet foam that have not been finished with the trigonal slit pattern described in § 164.013-3(c). The density of the material shall be determined by the method described in A.S.T.M. D 1564, sections 42 to 46.

(c) *Compression deflection.* Compression deflection shall be determined in accordance with Method 12151 of Federal Test Method Standard No. 601, except that the test specimens shall be compressed to 10 percent of their original thicknesses by compression forces applied at a rate of 0.5 inches per minute.

(d) *Water absorption.* Water absorption of the material shall be determined in accordance with paragraph 4.5.7 of MIL-P-40619.

(e) *Buoyancy in fresh water.* The buoyancy test shall be made with a sample of the material measuring approximately 1⅛" x 12" x 12". Securely attach a spring scale in a position directly over a test tank. Suspend a weighted wire basket from the scale in such a manner that the basket can be weighed while completely submerged under water. Proceed as follows:

(1) Weigh the empty wire basket under water.

(2) Place the sample inside the basket and submerge it so that the top of the basket is at least 2 inches below the surface of the water. Allow the samples to remain submerged 24 hours.

(3) After the 24 hour submergence period, weigh the wire basket with the sample inside while both are still under water.

(4) The buoyancy is computed as paragraph (e)(1) of this section minus paragraph (e)(3) of this section. The resulting value is divided by the volume of the polyethylene foam expressed in cubic feet. The final result is in lbs./cubic feet.

(f) *Volume loss on heat aging.* The volume loss shall be determined according to par. 4.5.9 of Military Specification MIL-P-40619.

(g) *Oil resistance.* The resistance to Navy grade fuel oil shall be determined according to para. 4.5.10 of Military Specification MIL-P-40619.

(h) *Odor.* The odor of unicellular polyethylene foam shall be determined by sniffing.

(i) *Compression set.* The compression set shall be measured one hour after removal of a 10-pound weight which has been applied to a sample approximately 1" x 1" x 1" for one hour at room temperature. The compression set shall be calculated by means of the following formula:

Compression set (percent) $= t_o - t_f \times 100 \div t_o$

where:
t_o = original thickness.
t_f = final thickness.

[CGFR 64-19, 29 FR 7360, June 5, 1964, as amended by CGFR 64-87, 30 FR 2028, Feb. 13, 1965]

§ 164.013-5 Procedure for acceptance.

(a) Unicellular polyethylene foam is not subject to formal approval, but will be accepted by the Coast Guard on the basis of this subpart for use in the manufacture of lifesaving equipment utilizing it.

(b) Upon receipt of an application requesting acceptance, the Commander of the Coast Guard District will detail a marine inspector to the factory to observe the production facilities and manufacturing methods, and to select from foam already manufactured sufficient sample material for testing for compliance with the requirements of this specification. A copy of the marine inspector's report, together with the sample material and one copy of an independent laboratory test report, will be forwarded to the Commandant and if satisfactory, notice of acceptance will be given to the manufacturer.

(c) Acceptance of unicellular polyethylene foam prior to being incorporated into finished products, or during the course of manufacture, shall in no case be construed as a guarantee of the acceptance of the finished product.

(d) The manufacturer of the foam shall provide the manufacturer of the lifesaving equipment with an affidavit stating that the foam conforms to all of the requirements of this subpart.

[CGFR 64-87, 30 FR 2029, Feb. 13, 1965]

Subpart 164.015—Plastic Foam, Unicellular, Buoyant, Sheet and Molded Shape

AUTHORITY: R.S. 4488 as amended, 4491, as amended, secs. 6 and 17, 54 Stat. 164, as amended, 166, as amended, sec. 3, 70 Stat. 152; 46 U.S.C. 481, 489, 526e, 526p, 390b. Treasury Department Orders 120, July 31, 1950, 15 FR 6521; 167-20, June 18, 1956, 21 FR 4894; and 167-38, Oct. 26, 1959, 24 FR 8857.

SOURCE: CGFR 65-37, 30 FR 11593, Sept. 10, 1965 unless otherwise noted.

§ 164.015-1 Applicable specifications and standards.

(a) *Specifications.* The following specification and standard, of the issue in effect on the date the plastic foam material is manufactured, form a part of this subpart:

(1) Military specification:

MIL-F-859—Fuel Oil, Boiler.

(2) Federal specification:

C-C-91—Candle illuminating.

(3) Federal standard:

Standard 601—Rubber: Sampling and Testing.

(4) A.S.T.M. standard:

D1692T—Flammability of Plastic Foam and Sheeting.

(b) *Copies on file.* Copies of the specifications and standards referred to in this section shall be kept on file by the plastic foam manufacturer with this subpart.

(1) The Federal Specification and the Federal Standard may be purchased from the Business Service Center, General Services Administration, Washington, D.C., 20407.

(2) The Military Specification may be obtained from the Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, Pa. 19120.

(3) The A.S.T.M. Standard may be purchased from the American Society for Testing Materials, 1916 Race Street, Philadelphia, Pa. 19103.

[CGFR 65-37, 30 FR 11593, Sept. 10, 1965, as amended by CGFR 65-64, 31 FR 563 Jan. 18, 1966]

§ 164.015-2 Types.

(a) Unicellular expanded polyvinyl chloride-acetate copolymer or synthetic rubber modified polyvinyl chloride, polymer or copolymer plastic foam shall be of three types as follows:

Type A—for life preservers, buoyant vests or buoyant cushions.
Type B—for buoyant vests or buoyant cushions.
Type C—for ring life buoys.

§ 164.015-3 Material and workmanship

(a) The unicellular plastic foam shall be all new material complying with the requirements of this specification. The results of the tests described in § 164.015-4 shall yield property values within the limits shown in Table 164.015-4(a).

(b) The unicellular plastic foam shall be produced in sheet stock or molded shapes.

§ 164.015-4 Inspections and tests.

(a) *General.* Unicellular plastic foam to be used in a finished product subject to inspection by the Coast Guard also shall be subject to inspection at the plant where the foam is manufactured. The manufacturer of the foam has primary responsibility for quality control over the production of the foam. A marine inspector shall be admitted to any place in the factory where production or partial processing of the foam takes place, and he may take samples of the foam or other materials for further inspections or tests. The manufacturer shall provide a suitable place and the apparatus necessary for the performance of certain tests to be witnessed by the marine inspector, the results of which shall comply with Table 164.015-4(a). Unless otherwise specified, all tests shall be conducted at a temperature of 21°±3°C. (70°±5°F.) The properties listed in Table 164.015-4(a) shall be determined on specimens of sheet foam or molded shapes.

TABLE 164.015-4(a)

Properties	Test method	Units	Type A	Type B	Type C
Density (maximum)	164.015-4(b)	Pounds/feet^3	5.0	5.0	8.5
Buoyancy in fresh water (minimum)	164.015-4(c)	Pounds/feet^3	54.0	54.0	52.0
Volume loss on heat aging (maximum).	164.015-4(d)	Percent	5.0	5.0	4.0
Compression deflection at 25 percent.	164.015-4(e)	P.s.i.	3.0 max.	3.0 max.	7.0 min.
Compression set (maximum)	164.015-4(f)	Percent	24	24	20
Fire retardance (maximum)	164.015-4(g)(1)	Seconds	2	....	30
		Inches	1	....	3
	164.015-4(g)(2)	Inches per minute	....	4	....
Tensile strength (minimum)	164.015-4(h)	P.s.i.	30	20	60
Ultimate elongation (minimum)	164.015-4(h)	Percent	75	75	....
Water absorption (maximum)	164.015-4(i)	Pounds/feet^2	.06	.06	.06
Flexibility at 0±2F	164.015-4(j)		No cracking	No cracking	....
Oil resistance	164.015-4(k)		(1)	(1)	(1)
Odor	164.015-4(l)		(2)	(2)	(2)

[1] No softening or swelling.
[2] Not objectionable.

(b) *Density.* The density of the material shall be determined by dividing the weight of the material by its volume and shall be expressed in pounds per cubic foot. The volume shall be determined by measuring the volume of water displaced by the material or by direct measurement of the specimen using vernier calipers reading to 0.001 inch A sheet specimen 4″ x 4″ x thickness furnished shall be used unless the foam is molded shape, then the largest single piece so molded shall be used.

(c) *Buoyancy in fresh water*—(1) *Specimens.* The buoyancy test shall be made with a sample of the sheet material measuring 12″ x 12″ x thickness of material furnished or with the largest molded shape furnished.

(2) *Procedure.* Securely attach a spring scale in a position directly over a test tank. Suspend a weighted wire basket from the scale in such a manner that the basket can be weighed while completely submerged in water. Proceed as follows:

(i) Weigh the empty basket under water.

(ii) Place the sample inside the basket and submerge it so that the top of the basket is at least 2 inches below the surface of the water. Allow the samples to remain submerged for 24 hours.

(iii) After 24 hours submergence period, weigh the wire basket with the sample inside while both are still under water.

(iv) The buoyancy is computed as paragraph (c)(2)(i) of this section minus (c)(2)(iii) of this section. The resulting value is divided by the volume of the polyvinyl chloride foam expressed in cubic feet. The final result is in lbs./cu. ft.

(d) *Volume loss on heat aging*—(1) *Specimen.* Test specimens shall consist of pieces 4″ x 4″ x the thickness of the material furnished. Where the foam is an object of molded shape, the largest single piece so molded shall be used for this test.

(2) *Procedure.* Volume before and after the heat aging test shall be determined by measuring the volume of water displaced by the material. The specimens shall be placed in an oven maintained at 140°±2°F., for a period of one week. At the end of that period the specimens shall be removed from the oven and allowed to recover in the open for 5 hours at 70°±2°F. before the measurement of final volume is made. The test shall be run in triplicate, the results averaged and the percentage of volume loss calculated.

(e) *Compression deflection.* Compression deflection shall be determined in accordance with method 12151 of Federal Standard 601, except that the deflection shall be maintained at 25 percent with automatic or manual control, and the load observed and recorded 60 seconds after the 25 percent deflection is reached.

(f) *Compression set*—(1) *Specimens.* The specimens shall have parallel top and bottom surfaces which shall be at right angles to the side surfaces. The specimen may be cylindrical or rectangular. The minimum dimension across the top shall be at least 1.0 times the thickness and the top a minimum of 1 square inch in area, and a maximum of 16 square inches in area.

(2) *Apparatus.* The apparatus shall consist of a compression device with two parallel plates, between which the test specimen shall be compressed by means of four studs and nuts. The plates may be steel, aluminum or any rigid smooth metal of sufficient thickness to withstand the required compression stresses without bending. The surfaces against which the test specimens are held shall be smooth and shall be thoroughly cleaned and wiped dry before each test. Metal shims inserted between the plates shall be used to limit the compression of the specimen.

(3) *Procedure.* Thickness, before and after the compression set test shall be measured as specified in paragraph (h)(1) of this section. The test specimens shall be compressed 25% of the original thickness for 22 hours. At the end of that period, the test specimens shall be removed from the set apparatus and allowed to rest for 24 hours before measurement of final thickness is made. The compression set shall be calculated by means of the following formula:

$$\text{Compression set (percent)} = [(h_o - h_1) \div (h_o - h_s)] \times 100 \qquad (1)$$

where:

h_o = the original thickness.

h_1 = the thickness 24 hours after removal from apparatus.

h_s = the test compression thickness.

(g) *Fire retardance*—(1) *Types A and C foams.* The test specimens shall be ¼ inch in thickness, 1 inch in width and approximately 6 inches in length. The specimens shall be clamped at one end in a position such that the long dimension forms a 45° angle with the horizontal and with the widths in a vertical position. A bunsen burner with a 1 inch yellow flame shall be applied to the lower or free end of the specimen for 15 seconds. The burner shall then be removed and the time that the specimen continues to burn after removal of the burner shall be recorded as burning time. The length of char shall also be recorded. The test shall be performed in a location free from drafts. The average results of three determinations shall be reported. A plain wax candle equivalent to those meeting Federal Specification C-C 91 may be substituted for the bunsen burner.

(2) *Type B foam.* The test specimens shall be ½ inch in thickness, 2 inches in width and approximately 6 inches in length. The specimens shall be tested in accordance with American Society for Testing Materials Designation D-1692T specification standard.

(h) *Tensile strength and the ultimate elongation*—(1) *Specimens.* The test specimens shall be dumbbell shaped, conforming in shape to die I of method 4111 of Standard FED-STD-601. The thickness of the specimen shall be ¼ inch. Two specimens shall be taken from the center of the sample piece and two from one side, keeping the skin surface intact. The thickness shall be measured to the nearest 0.001 inch by a suitable measurement device such as a vernier caliper with a sliding vernier to read 0.001 inch. Care shall be taken not to compress or distort the specimen when measuring. The specimens taken from the center will be skinless; the others will have skin on one side. One-inch bench marks shall be placed midway on the constricted portion of the tensile specimen.

(2) *Procedure.* (i) The tensile strength of the specimens shall be determined in a standard tensile testing machine with a rate of separation of jaws set at 2 inches per minute. The bench marks shall be followed with a suitable pair of dividers until the specimen ruptures. A minimum of 4 specimens shall be tested and if any specimen breaks at the clamp or any specimen exhibits any obvious defects, the results obtained therewith shall be discarded. A new similar specimen shall then be prepared and tested. The tensile strength shall be calculated by dividing the breaking load (to the nearest 0.1 pound) by the original area of the cross section of the specimen in square inches and the result shall be expressed in pounds per square inch. The percent ultimate elongation shall be calculated as follows:

$$D_1 - D \div D \times 100 \qquad (2)$$

where:

D = distance between knife edges of bench marker.

D_1 = distance between bench marks at moment of rupture to the nearest 1/32 inch.

(3) *Averaging determinations.* The tensile strength in pounds per square inch and percent ultimate elongation of four determinations shall be averaged for each sample.

(i) *Water absorption*—(1) *Specimens.* Test specimens shall be 4″ x 4″ square and approximately 1″ in thickness. The specimen may have the natural skin on the top and bottom surfaces.

(2) *Procedure.* The specimens shall be weighed and submerged in water under a 10-foot head of water (equal to 4.35 psi) at room temperature (65°-95° F.) for 48 hours. The specimens shall then be placed in a stream of air for the minimum time required to remove visible water from the surface, and reweighed. The results shall be calculated in terms of pounds of water gain per square foot of total exposed surface.

(j) *Flexibility*—(1) The size of the specimen shall be approximately 1″ x 8″ with a thickness of ¼″±1/16″. The test specimens and equipment shall be conditioned for at least 4 hours at 0° F ±2°F., and bent 180° around a ½" diameter steel mandril within 5 seconds at the test temperature. Care shall be taken to avoid warming the test specimens, particularly at or near the bend point, in performing the test.

(k) *Oil resistance*—(1) *Specimens.* The test specimens shall be a disk approximately 1" in diameter and 1" (approximately) in thickness.

(2) *Procedure.* The specimen shall be immersed in fuel oil conforming to Navy special grade of Specification MIL-F-859 for 70 hours. The specimen shall then be removed, dipped in alcohol and blotted with filter paper. The specimen shall then be compared to an untreated specimen of similar size for apparent softness and visible swelling.

(l) *Odor.* The odor of unicellular polyvinyl chloride foam shall be determined by sniffing.

[CGFR 65-37, 30 FR 11593, Sept. 10, 1965, as amended by CGFR 65-64, 31 FR 563, Jan. 18, 1966]

§ 164.015-5 Procedure for acceptance.

(a) Unicellular plastic foam is not subject to formal approval, but will be accepted by the Coast Guard on the basis of this subpart for use in the manufacture of lifesaving equipment utilizing it.

(b) Upon receipt of an application requesting acceptance, the Commander of the Coast Guard District will detail a marine inspector to the factory to observe the production facilities and manufacturing methods and to select from foam already manufactured sufficient sample material for testing for compliance with the requirements of this specification. A copy of the marine inspector's report, together with the sample material and one copy of an independent laboratory test report will be forwarded to the Commandant and if satisfactory notice of acceptance will be given to the manufacturer.

(c) Acceptance of unicellular plastic foam prior to being incorporated into finished products, or during the course of manufacture, shall in no case be construed as a guarantee of the acceptance of the finished products.

(d) The manufacturer of the foam shall provide the manufacturer of the lifesaving equipment with an affidavit certifying that the foam conforms to all of the requirements of this subpart.

Subpart 164.016—Microcellular Nylon, Sheet and Molded Shapes

AUTHORITY: R.S. 4405, as amended, R.S. 4462, as amended, R.S. 4488, as amended, R.S. 4491, as amended, sec. 6, 54 Stat. 1641, as amended, sec. 17, 54 Stat. 166, as amended, sec. 3, 70 Stat. 152, sec. 6(b)(1), 80 Stat. 937; 46 U.S.C. 375, 416, 481, 489, 526e, 526p, 390b, 49 U.S.C. 1655(b)(1); 49 CFR 1.46(b).

SOURCE: CGFR 70-143, 35 FR 19967, Dec. 30, 1970.

§ 164.016-1 Reference specifications and standards.

(a) *Specifications and standards.* The following specifications and standards are listed for reference.

(1) *Military specification.* (i) MIL-F-859, Fuel oil, boiler.

(2) *Federal standard.* (i) Standard 601, Rubber: Sampling and testing.

(3) *American society for testing and materials standard.* (i) ASTM D1692T, Flammability of plastic foam and sheeting.

(b) *Copies on file.* Copies of the specifications and standards referred to in this section in effect on the date of manufacture of the microcellular nylon material together with a copy of this subpart shall be kept on file by the manufacturer. The military specification may be obtained from the Commanding Officer, Naval Supply Depot, 5801 Tabor Ave., Philadelphia, Pa. 19120. The Federal standard may be purchased from the Business Service Center, General Services Administration, Washington, D.C. 20407. The ASTM standard may be purchased from the American Society for Testing and Material, 1916 Race Street, Philadelphia, Pa. 19103.

§ 164.016-2 Types.

Microcellular nylon polymer shall be of one grade containing an average cell size not larger than 0.01 inch.

§ 164.016-3 Material and workmanship.

(a) The microcellular nylon shall be all new material complying with the requirements of this specification. The results of the tests described in § 164.016-4 shall yield property values within the limits shown in table 164.016-4(a).

(b) The microcellular nylon shall be produced in sheet stock or molded shapes.

§ 164.016-4 Inspections and tests.

(a) *General.* Microcellular nylon to be used in a finished product subject to inspection by the U.S. Coast Guard shall be subject to inspection at the plant where the nylon is manufactured. The manufacturer of the nylon has primary responsibility for quality control over the production of the nylon. A marine inspector shall be admitted to any place in the factory where production or partial processing of the nylon takes place, and he may take samples of the nylon or other materials for further inspections or tests. The manufacturer shall provide a suitable place and the apparatus necessary for the performance of certain tests to be witnessed by the marine inspector, the results of which shall comply with table 164.016-4(a). Unless otherwise specified, all tests shall be conducted at a temperature of 21°±3° C. (70°±5°F.) and 50% R.H. The following properties shall be determined on specimens of sheet foam or molded shapes:

TABLE 164.016-4(a)

Properties	Test method	Units	Type I	Type II
	Section			
Density (max.)	164.016-4(b)	Lbs./ft. ³	4.0	8.0
Buoyancy in Fresh water (min.).	164.016-4(c)	Lbs/ft. ³	56.0	54.0
Volume Loss on Heat Aging (max.).	164.016-4(d)	Percent	5.0	5.0
Compression Deflection at 25 percent.	164.016-4(e)	P.s.i.	20.0 (max.)	50.0 (min.)
Compression Set (max.).	164.016-4(f)	Percent	20	20
Fire Retardance (max.)	164.016-4(g)	In. per min.	3	2
Tensile Strength (min.)	164.016-4(h)	P.s.i	350	600
Ultimate Elongation (min.).	164.016-4(h)	Percent	75	75
Water Absorption (max.).	164.016-4(i)	Lbs./ft. ²	0.06	0.06
Flexibility at 0° F	164.016-4(j)		No cracking	No cracking.
Oil Resistance	164.016-4(k)		No softening or swelling.	
Odor	164.016-4(l)		Not objectionable.	
Cell Size	164.016-4(m)	Cells/inch	>100	>100

(b) *Density.* The density of the material shall be determined by dividing the weight of the material by its volume and shall be expressed in pounds per cubic foot. The volume shall be determined by measuring the volume of water displaced by the material or by direct measurement of the specimen using vernier calipers reading to 0.001 inch. A sheet specimen 4" by 4" by thickness furnished shall be used unless the nylon is molded shape, then the largest single piece so molded shall be used.

(c) *Buoyancy test method*—(1) *Specimens.* The buoyancy test shall be made in fresh water with a sample of the sheet material measuring 12" by 12" by thickness of material furnished or with the largest molded shape furnished.

(2) *Procedure.* A spring scale shall be securely attached in a position directly over a test tank. A weighted wire basket shall be suspended from the scale in such a manner that the basket can be weighed while completely submerged in water. The test procedures shall be as follows:

(i) Weigh the empty basket under water.

(ii) Place the sample inside the basket and submerge it so that the top of the basket is at least 2" below the surface of the water. Allow the samples to remain submerged for 24 hours.

(iii) After 24 hours submergence period, weigh the wire basket with the sample inside while both are still under water.

(iv) The buoyancy is computed as paragraph (c)(2)(i) of this section minus paragraph (c)(2)(iii) of this section. The resulting value is divided by the volume of the microcellular nylon expressed in cubic feet. The final result is in lbs./cu. ft.

(d) *Volume loss on heat aging*—(1) *Specimen.* Test specimens shall consist of pieces 4" by 4" by the thickness of the material furnished. Where the nylon is an object of molded shape, the largest single piece so molded shall be used for this test.

(2) *Procedure.* Volume before and after the heat aging test shall be determined by measuring the volume of water displaced by the material. The specimens shall be placed in an oven maintained at 140°±2°F. for a period of 1 week. At the end of that period the specimens shall be removed from the oven and allowed to recover in the open for 5 hours at 70°±2°F. before the measurement of final volume is made. The test shall be run in triplicate, the results averaged and the percentage of volume loss calculated.

(e) *Compression deflection.* Compression deflection shall be determined in accordance with Method 12151 of Federal Standard 601, except that the deflection shall be maintained at 25 percent with automatic control, and the load observed and recorded 60 seconds after the 25 percent deflection is reached.

(f) *Compression set*—(1) *Specimens.* The specimens shall have parallel top and bottom surfaces which shall be at right angles to the side surfaces. The specimen may be cylindrical or rectangular. The minimum dimension across the top shall be at least 1.0 times the thickness and the top a minimum of 1 square inch in area, and a maximum of 16 square inches in area.

(2) *Apparatus.* The apparatus shall consist of a compression device with two parallel plates, between which the test specimen shall be compressed by means of four studs and nuts. The plates may be steel, aluminum or any rigid smooth metal of sufficient thickness to withstand the required compression stresses without bending. The surfaces against which the test specimens are held shall be smooth and shall be thoroughly cleaned and wiped dry before each test. Metal shims inserted between the plates shall be used to limit the compression of the specimen.

(3) *Procedure.* Thickness, before and after the compression set test, shall be measured as provided by paragraph (h)(1) of this section. The test specimens shall be compressed 25 percent of the original thickness for 22 hours. At the end of that period, the test specimens shall be removed from the set apparatus and allowed to rest for 24 hours before measurement of final thickness is made The compression set shall be calculated by means of the following formula:

$$\text{Compression set (percent)}=(h_o-h_i)\div(h_o-h_s)\times 100$$

where:

h_o equals the original thickness

h_i equals the thickness 24 hours after removal from apparatus

h_s equals the test compression thickness

(g) *Fire retardance.* (1) The test specimens shall be ½" in thickness, 2" in width and approximately 6" in length The specimens shall be tested in accordance with American Society for Testing and Materials Designation D-1692T specification standard.

(h) *Tensile strength and the ultimate elongation*—(1) *Specimens.* The test specimens shall be dumbbell shaped, conforming in shape to die I of Method 4111 of Standard FED-STD-601. The thickness of the specimen shall be taken from the center of the sample piece and two from one side, keeping the skin surface intact. The thickness shall be measured to the nearest 0.001 inch by a suitable measurement device such as a vernier caliper with a sliding vernier to read 0.001 inch. Care shall be taken not to compress or distort the specimen when measuring. The specimens taken from the center will be skinless; the others will have skin on one side. One-inch bench marks shall be placed midway on the constricted portion of the tensile specimen.

(2) *Procedure.* The tensile strength of the specimens shall be determined in a standard tensile testing machine with a rate of separation of jaws set at 2 inches per minute. The bench marks shall be followed with a suitable pair of dividers until the specimen ruptures. A minimum of 4 specimens shall be tested and if any specimen breaks at the clamp or any specimen exhibits any obvious defects, the results obtained therewith shall be discarded. A new similar specimen shall then be prepared and tested. The tensile strength shall be calculated by dividing the breaking load (to the nearest 0.1 pound) by the original area of the cross section of the specimen in square inches and the result shall be expressed in pounds per square inch.

The percent ultimate elongation shall be calculated as follows:

$$(D_1 - D) \div D \times 100$$

where:

D equals distance between knife edges of bench marker

D_1 equals distance between bench marks at moment of rupture to the nearest 1/32 inch.

The tensile strength in pounds per square inch and percent ultimate elongation of four determinations shall be averaged for each sample.

(i) *Water absorption*—(1) *Specimens.* Test specimens shall be 4" x 4" square and approximately 1" in thickness and the specimen may have the natural skin on the top and bottom surfaces. Where the nylon is a molded shape, the longest single piece so molded shall be used for this test.

(2) *Procedure.* The specimens shall be weighed and submerged in water under a 10-foot head of water (equal to 4.34 p.s.i. at room temperature (65°-95°F.) for 48 hours. The specimens shall then be placed in a stream of air for the minimum time required to remove visible water from the surface, and reweighed. The results shall be calculated in terms of pounds of water gain per square foot of total exposed surface.

(j) *Flexibility.* (1) The size of the specimen shall be approximately 1" x 8" with a thickness of 1/4"±1/16". The test specimens and equipment shall be conditioned for at least four hours at 0° F.±2°F., and bent 180° around a 1/2" diameter steel mandrill within 5 seconds at the test temperature. Care shall be taken to avoid warming the test specimens, particularly at or near the bend point, in performing the test.

(k) *Oil resistance*—(1) *Specimens.* The test specimens shall be a disk approximately 1" in diameter and 1" inch in thickness.

(2) *Procedure.* The specimen shall be immersed in fuel oil conforming to Navy special grade of Specification MIL-F-859 for 70 hours. The specimen shall then be removed, dipped in alcohol and blotted with filter paper. The specimen shall then be compared to an untreated specimen of similar size for apparent softness and visible swelling.

(l) *Odor.* The odor of microcellular nylon shall be determined by sniffing.

(m) *Cell size.* Four test specimens shall be taken from various sections of the molded piece. Using vernier calipers, bench marks .10 inch apart shall be scribed on each test sample. Using 100X magnification photomicrographs, the number of cells shall be counted in a straight line between the two bench marks.

[CGFR 70-143, 35 FR 19967, Dec. 30, 1970; 36 FR 5606, Mar. 25, 1971]

§ 164.016-5 Procedure for acceptance.

(a) Microcellular nylon is not subject to formal approval, but will be accepted by the Coast Guard on the basis of this subpart for use in the manufacture of lifesaving equipment utilizing it.

(b) Upon receipt of an application requesting acceptance, the Commander of the Coast Guard District will detail a marine inspector to the factory to observe the production facilities and manufacturing methods, and to select, from microcellular nylon already manufactured, sufficient sample material for testing for compliance with the requirements of this specification. A copy of the marine inspector's report, together with the sample material and one copy of an independent laboratory test report, will be forwarded to the Commandant and, if satisfactory, notice of acceptance will be given to the manufacturer.

(c) Acceptance of microcellular nylon prior to being incorporated into finished products, or during the course of manufacture, shall in no case be construed as a guarantee of the acceptance of the finished products.

(d) The manufacturer of the nylon shall provide the manufacturer of the lifesaving equipment with an affidavit certifying that the foam conforms to all of the requirements of this subpart.

(R.S. 4405, as amended, R.S. 4462, as amended, sec. 6(b)(1), 80 Stat. 937; 46 U.S.C. 375, 416, 49 U.S.C. 1655(b)(1); 49 CFR 1.46 (b) (35 FR 4959))

Subpart 164.018—Retroreflective Material for Lifesaving Equipment

AUTHORITY: 46 U.S.C. 375, 390b, 391a, 416, 481, 526p, 1454 and 1488; 49 U.S.C. 1655(b); 50 U.S.C. 198; and 49 CFR 1.46

SOURCE: CGD 76-028, 44 FR 38786, July 2, 1979, unless otherwise noted.

§ 164.018-1 Scope.

This subpart prescribes design requirements, approval tests, and procedures for approving retroreflective material used on lifesaving equipment.

§ 164.018-3 Classification.

The following types of retroreflective material are approved under this specification:

(a) Type I—Material used on flexible surfaces and rigid surfaces, except rigid surfaces that are continuously exposed.

(b) Type II—Weather resistant material used on continuously exposed rigid surfaces.

§ 164.018-5 Specifications and standards incorporated by reference.

(a) The following federal and military specifications and standards are incorporated by reference into this subpart:

(1) Federal Specification L-P-375 C (April 23, 1970), entitled "Plastic Film, Flexible, Vinyl Chloride", as amended by Amendment 2 of December 2, 1976.

(2) Federal Specification L-S-300 B (July 12, 1974), entitled "Sheeting and Tape, Reflective: Nonexposed Lens, Adhesive Backing."

(3) Federal Specification CCC-C-426 D (August 12, 1970), entitled "Cloth, Drill, Cotton."

(4) Federal Specification CCC-C-443 E (December 2, 1974), entitled "Cloth, Duck, Cotton (Single and Plied Filling Yarns, Flat)."

(5) Federal Test Method Standard 141a (September 1, 1965), entitled "Paint, Varnish, Lacquer and Related Materials; Methods of Inspection, Sampling and Testing." (Method 6141 "Washability of Paints", and Method 6142 "Scrub Resistance" as amended May 1, 1974).

(6) Federal Test Method Standard 370 (March 1, 1977), entitled "Instrumental Photometric Measurements of Retroreflective Materials and Retroreflective Devices."

(7) Military Specification MIL-C-17415 E (April 16, 1964), entitled "Cloth, Coated, and Webbing, Inflatable Boat and Miscellaneous Use", as amended by Amendment 5 of April 26, 1976.

(8) Military Specification MIL-R-21607 D (August 5, 1976), entitled "Resins, Polyester, Low Pressure Laminating, Fire-retardant."

(9) Military Specification MIL-C-43006 E (March 24, 1978), entitled "Cloth and Strip Laminated, Vinyl Nylon High Strength, Flexible."

(b) Federal and military specifications and standards may be obtained from Customer Service, Naval Publications, Forms Center, 5801 Tabor Ave., Philadelphia, Pa. 19120. These materials are also on file in the FEDERAL REGISTER library.

(c) Approval to incorporate by reference the materials listed in this section was obtained from the Director of the Federal Register on June 14, 1979.

(d) When changes are made to a specification or standard incorporated by reference into this subpart, the effective date for its use will be the effective date set by the issuing authority unless otherwise determined by the Coast Guard.

§ 164.018-7 Approval procedures.

(a) An application for approval of retroreflective material must be sent to the Commandant (G-MMT-3/83), U.S. Coast Guard, Washington, D.C. 20590.

(b) Each application for approval must contain—(1) The name and address of the applicant;

(2) Two copies of plans or specifications of the material;

(3) A detailed description of the quality control procedures used in manufacturing the material; and

(4) A test report containing observations and results of approval testing conducted.

(c) The Commandant advises the applicant whether the retroreflective material is approved. If the material is approved, an approval certificate is sent to the applicant.

§ 164.018-9 Design requirements.

(a) Type I retroreflective material must be capable of being attached to lifesaving equipment either by sewing it to the equipment or by means of an adhesive. Type II material must be capable of being attached to lifesaving equipment either by mechanical fasteners or by an adhesive.

(b) The following information must be stated on retroreflective material or on the package in which it is supplied to a user:

(1) Each surface to which the retroreflective material is designed to be attached.

(2) The instructions for attaching the material to each surface described in paragraph (b)(1) of this section.

(c) When retroreflective material designed for use with an adhesive is tested in accordance with the "adhesion" test method listed in § 164.018-11, the material must not peel for a distance of more than 5 cm (2 in.).

(d) When dry material is tested in accordance with the "reflective intensity" test method listed in § 164.018-11, the reflective intensity of the material must be equal to or greater than the values for reflective intensity listed in Table 164.018-9.

(e) When wet material is tested in accordance with the "reflective intensity during rainfall" test method listed in § 164.018-11, the reflective intensity of the material must be at least 90 percent of the values listed in Table 164.018-9.

(f) The reflective intensity of material after testing in accordance with the "resistance to accelerated weathering" test method listed in § 164.018-11 must be at least 50 percent of the values listed in Table 164.018-9.

(g) After testing in accordance with the "fungus resistance" test method listed in § 164.018-11, retroreflective material must not support fungus growth, and the reflective intensity of the material must be equal to or greater than the values for reflective intensity listed in Table 164.018-9.

(h) The reflective intensity of materials after testing in accordance with the "resistance to water immersion" test method described in § 164.018-11, must be equal to or greater than the values listed in Table 164.018-9, except that retroreflectivity is not required in the area extending outward 5 mm (0.2 inches) from each side of the cuts made in the material.

(i) The reflective intensity of material after testing in accordance with the "abrasion resistance" test method described in § 164.018-11(b)(2), must be at least 50 percent of the values listed in Table 164.018-9

(j) After retroreflective material is tested in accordance with the "soil resistance and cleanability" test method described in § 164.018-11(b)(3) the material must not have any visible damage or permanent soiling.

(k) Except as provided in paragraphs (c) through (j) of this section, retroreflective material when tested in accordance with the test methods listed in § 164.018-11 must meet the requirements prescribed for those test methods in Federal Specification L-S-300.

TABLE 164.018-9—REFLECTIVE INTENSITY

Divergence angle[1] (Observation angle)[2]	Incidence angle[1] (Entrance angle)[2]	Reflective intensity[1] (Specific intensity per unit area)[2]
0.2°	−4°	150
.2°	+30°	75
.2°	+45°	50
.5	−4°	57
.5	+30°	33
.5	+45°	25
2.0°	−4°	2.5
2.0°	+30°	2.0
2.0°	+45°	1.0

[1] These terms are described in Federal Specification L-S-300.

[2] These terms are described in Federal Test Method Standard 370.

§ 164.018-11 Approval tests.

(a) Retroreflective material submitted for Coast Guard approval must be tested in accordance with the following test methods described in Federal Specification L-S-300:

(1) Test conditions.

(2) Test panels.

(3) Adhesion test method using a 0.79 kg (1.75 lb.) test weight, except that one test panel must be immersed in distilled water in a covered container for 16 hours before the weight is applied and the other test panel must be immersed in salt water (4% NaCl by weight) in a covered container for 16 hours before the weight is applied. (This test method is required only for retroreflective material that is designed for use with an adhesive. If a particular test panel used in testing results in a test failure, the retroreflective material will not be approved for attachment to material of the type used as the test panel. The retroreflective material may nevertheless be approved for use with other types of material depending on the results of testing with the other panels. See paragraph (d) of this section for a listing of tests panels used.)

(4) Flexibility at standard conditions test method, except that when testing Type I material—

(i) The material must be unmounted;

(ii) A 1.5 mm (1/16-inch) mandrel must be used in place of the mandrel described in the test method; and

(iii) After testing at standard conditions, the material must be placed in a chamber at a temperature of −18°C (0°F) for at least 1 hour and then retested in the chamber at that temperature.

(5) Reflective intensity.

(6) Resistance to accelerated weathering test method and subtest methods "reflective intensity after accelerated weathering," "reflective intensity during rainfall," and "adhesion after accelerated weathering." (The "adhesion after accelerated weathering" test method is required only for materials designed for use with an adhesive. The "resistance to accelerated weathering" test method must be performed for 250 hours, if testing Type I material, and for 1,000 hours if testing Type II material.)

(7) Resistance to heat, cold, and humidity.

(8) Fungus resistance.

(b) Retroreflective material submitted for approval must also be tested as follows:

(1) *Resistance to water immersion.* Two test panels are used. The test panels and test conditions must meet paragraphs (a)(1) and (a)(2) of this section. The retroreflective material on each test panel is cut with a sharp knife from each corner to the corner diagonally opposite so that an "X" is formed. The cuts must be made completely through the material to the metal panel. One panel is immersed in distilled water in a covered container. The other panel is immersed in salt water (4% NaCl by weight) in a covered container. After 16 hours in water, the panels are removed from the containers, rinsed of deposits, and dried. Reflective intensity values at the angles listed in Table 164.018-9 must be measured within 2 hours after removal of the panels from the water. When measuring the reflective intensity values, the area within 5 mm (0.2 in.) of either side of the "X" cuts, and within 5 mm of the cut edges of the material, must not be counted.

(2) *Abrasion resistance.* One test panel is used. The panel and test conditions must meet paragraphs (a)(1) and (a)(2) of this section. The test apparatus must meet Federal Test Method Standard 141, Method 6142, except that the brush must be dry. One thousand brush strokes are applied to the material. The test panel is then wiped with a clean soft cloth. Thereafter, the reflective intensity of the area of the material in contact with the brush is measured at the angles listed in Table 164.018-9.

(3) *Soil resistance and cleanability.* One panel is used. The test panel and test conditions must meet paragraphs (a)(1) and (a)(2) of this section. A soiling medium is applied to the material as described in Federal Test Method Standard 141, Method 6141. The soiled area is then covered with a laboratory watch glass or similar device. After 24

hours, the material is uncovered and the soil medium wiped off with a clean, dry, soft cloth. The material is then wetted with mineral spirits and wiped with a cloth soaked in mineral spirits. Thereafter, it is washed with a 1 percent (by weight) solution of detergent in warm water and rinsed and dried with a clean, dry, soft cloth.

(c) Each measurement of reflective intensity required in paragraphs (a), (b)(1), and (b)(2) of this section must be made using either—

(1) The L-S-300 procedure for measuring reflective intensity; or

(2) The procedure for measuring specific intensity per unit area in Federal Test Method Standard 370, except that the test apparatus arrangement required in L-S-300 must be used.

(d) If material is designed for use with an adhesive, the "adhesion" test method required by paragraph (a)(3) of this section must be repeated using a 0.79 kg. (1.75 lb.) test weight and using each of the following materials as test panels in place of the aluminum test panels required by this test method:

(1) Smooth panel of cured polyester laminating resin meeting MIL-R-21607 (Types I and II material).

(2) Cotton drill (Type I material only) meeting CCC-C-426, or cotton duck meeting CCC-C-443 (Type I material only).

(3) Vinyl-nylon laminated cloth meeting MIL-C-43006 (Type I material only).

(4) Vinyl film meeting L-P-375 (Type I material only).

(5) Rubber coated cloth meeting MIL-C-17415 (Type I material only).

(e) Each flexible material listed in paragraph (d) of this section when used as a test panel must be bonded to a rigid backing.

(f) Test panel material listed in paragraph (d) must—

(1) Be taken from an item of Coast Guard approved lifesaving equipment; or

(2) Be certified by the manufacturer of the material that it meets the applicable specification in paragraph (d) of this section.

§ 164.018-13 Production inspections.

The Coast Guard does not inspect retroreflective material approved under this subpart on a regular schedule. However, the Commandant may select samples and conduct tests and examinations whenever necessary to determine whether retroreflective material is being manufactured in compliance with the requirements of this subpart.

PART 165 [RESERVED]

FINDING AIDS

A list of current CFR volumes, a list of superseded CFR volumes, and a list of CFR titles, subtitles, chapters, subchapters and parts are included in the CFR Index and Finding Aids volume to the Code of Federal Regulations which is published separately and revised annually.

Material Approved for Incorporation by Reference
Table of CFR Titles and Chapters
Alphabetical List of Agencies Appearing in the CFR
List of CFR Sections Affected

422

BLANK PAGE

Material Approved for Incorporation by Reference

The Director of the Federal Register approves the following incorporations by reference for one year effective October 1, 1981, unless otherwise noted (5 U.S.C. 552(a) and 1 CFR Part 51). For more information on incorporation by reference, see the preliminary pages of this volume.

46 CFR SUBCHAPTER Q COAST GUARD, DEPARTMENT OF TRANSPORTATION

American Society for Mechanical Engineers	46 CFR
United Engineering Center, 345 E. 47th St., New York, NY 10017	
Boiler and Pressure Vessel Code: Section IV—par. HG-402 Discharge Capacities of Safety and Safety Relief Valves, 1980.	162.012-1; 162.013-1
Section I—par. PG-67 to 72 Design and Construction, and Tests 1977-1979.	162.001-1
Par. PG-69—Testing 1977-1979	162.001-1
Par. PG-71—Mounting 1977-1979	162.001-1
Par. PG-110—Stamping of Safety Valves 1977-1979	162.001-1
Section VIII—Par. UG-131 Certification of Capacity for Pressure Relief Valves, 1980.	162.018-1
American Society for Testing and Materials	
1916 Race St., Philadelphia, PA 19103	
ASTM A 27-80—Mild to Medium Strength Carbon Steel Castings	160.032-1
ASTM A 36-77—Structural Steel	160.035-1
ASTM A 216-77—Carbon-Steel Casting Suitable for Fusion Welding for High Temperature Service.	160.032-1
ASTM A 525-80—Steel Sheets, Zinc-Coated (Galvanized) by the Hot Dip Process.	160.035-1
ASTM B 61-80—Steam or Valve Bronze Castings	162.014-1
ASTM B 117-73—Method of Salt Spray (Fog) Testing	161.002-1; 161.004-1; 161.006-1; 161.071-3
ASTM C 177-76—Standard Test Method for Steady State Thermal Transmission Properties by Means of the Guarded Hot Plate.	160.071-3
ASTM C 518-76—Standard Test Method for Steady State Thermal Transmission Properties by Means of the Heat Flow Meter.	160.071-3
ASTM D 413-76—Adhesion of Vulcanized Rubber (Friction Test)	160.055-1
ASTM D 570-77—Water Absorbtion of Plastics	160.055-1
ASTM D 882-75—Tensile Properties of Thin Plastic Sheeting	160.071-3; 160.055-1
ASTM D 1004-66—Tear Resistance of Plastic Film and Sheeting	160.055-1; 160.071-3
ASTM D 1571-77—Cloth Woven Asbestos	164.009-3
ASTM E 84-80—Standard Test Method for Surface Burning Characteristics of Building Materials.	164.012-1
ASTM E 119-80—Fire Testing of Building Construction and Materials	164.007-1; 164.008-1
ASTM D 3574-77—Flexible Cellular Materials—Slab Bonded and Molded Urethane Foam, Testing.	164.031-1
Coast Guard	
G-MMT/12, 2100 Second St. SW, Washington, DC 20593	

Coast Guard—Continued	46 CFR
DWG No. F-49-6-1—Life Preserver, Kapok, Adult	160.002-1
DWG No. F-49-6-5—Life Preserver, Kapok, Child	160.002-1
DWG No. 160.005-1—Life Preserver, Fibrous Glass, Adult and Child (Jacket Type).	160.005-1
DWG No. 160.009—Cork and Balsa Wood Ring Life Buoy; arrangement and construction details.	160.009-1
DWG No. 160.013-1—Hatchet (Lifeboat and Liferaft)	160.013-1
DWG No. 160.017-1(b)—Ladders, Embarkation-Debarkation	160.017-1
DWG No. 160.027-4—Rectangular Balsa Wood Life Float with Platform, Net and Rigging.	160.027-1
DWG No. 160.043-1(b)—Jackknife (with Can Opener)	160.043-1
DWG No. 160.047-1—Buoyant Vest, Kapok or Fibrous Glass, Adult and Child.	160.047-1
DWG No. 160.048-1—Buoyant Cushion, Fibrous Glass	160.048-1
DWG No. 160.049-1—Buoyant Cushion, Plastic Foam	160.049-1
DWG No. 160.052-1—Buoyant Vest, Unicellular Plastic Foam, Adult and Child.	160.052-1
DWG No. 160-055-1A—Life Preservers, Unicellular Plastic Foam, Adult.	160.055-1
DWG No. 160.055-1B—Life Preservers, Unicellular Foam, Child	160.055-1
DWG No. 160.060-1—Buoyant Vest, Unicellular Polyethylene Foam, Adult and Child.	160.060-1
DWG No. 164.013-1—Pattern, Trigonal Slit, for Polyethylene Foam Slab Material.	164.013-1
Compressed Gas Association	
500 Fifth Ave., New York, NY 10036	
S-1.2.5.2—Flow Tests of Safety Relief Valves (Pamphlet 1.2, para. 5.2), 1979.	162.018-1
National Bureau of Standards	
C/O Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402	
Special Pub. 440 (SD Cat. No. C13.10:440) Color: Universal Language and Dictionary of Names, 1976.	160.021-1; 160.022-1; 160.024-1; 160.036-1; 160.037-1; 160.057-1
Naval Publications Forms Center	
Customer Service—Code 1052, 5801 Tabor Ave., Philadelphia, PA 19120	
Federal Specifications: C-C-91 Candle, Illuminating, D	164.015-1
CCC-C-426—Cloth, Cotton Drill D	160.048-1; 160.049-1; 160.055-1; 164.018-5
CCC-C-443—Cloth, Cotton, Duck, Plied Filling Yarns, Flat, E, and Amdt. 1.	160.009-1, 164.018-5
CCC-C-700—Cloth, Coated, Vinyl (Artificial Leather), G	160.048-1; 160.049-1; 160.055-1
GG-K-391—Kits (Empty), First Aid, Burn Treatment and Snakebite; and kit contents, A, and Amdt. 4.	160.041-1
CGG-A-926—Axes, C, and Amdt. 2	160.013-1
HH-M-351—Millboard, Asbestos, E, and Amdt. 2	164.009-3
L-P-375—Plastic Film, Flexible, Vinyl Chloride, C, and Amdt. 3	160.002-1; 160.005-1; 160.047-1; 160.048-1; 164.018-1

Naval Publications Form Center—Continued	46 CFR
L-P-390—Plastic Molding and Extrusion Materials, Polyethylene and Copolymers (Low, Medium, and High Density), C, and Amdt. I.	161-010-1
L-P-393—Plastic Molding Material Polycarbonate, Injection and Extrusion, A, and Amdt. 2.	
L-P-406—Plastics, organic; General Specification (Test Methods), B, and Amdt. 1.	161.010-1
L-S-300—Sheeting and Tape, Reflective: Non-exposed Lens, Adhesive Backing, B.	164.018-5
QQ-B-611—Brass, Commercial; Bars, plates, rods shapes, Sheets and Strip, A, and Amdt. 4.	161.006-1
QQ-I-706—Iron and Steel; Sheet, tinned (Tinplate), A, and Amdt. 1	160.061-1
QQ-W-423—Wire, Steel, Corrosion-resisting, B	160.061-1
RR-C-271—Chain and Attachments, welded, weldless, and roller chain, B.	160.017-1
T-R-605—Rope, Manila and Sisal, B, and Amdt. 3	160.017-1; 160.031-1; 160.009-1; 160.028-1
TT-E-489—Enamel, Alkyd, Gloss (for Exterior and Interior Surfaces), G.	161.001-1; 161.010-1
TT-P-59—Paint, Ready-mixed, International Orange (not for Residential Use), E, and Amdt. 1.	160.035-1
TT-W-572—Wood Preservative: Water-repellant, B, and Amdt. 1	160.017-1
V-T-276—Thread, Cotton, H	160.001-1; 160.009-1; 160.010-1
V-T-285—Thread, Polyester, D	160.001-1; 160.009-1
V-T-295—Thread, Nylon, D	160.001-1; 160.009-1; 160.050-1
VV-G-671—Grease; Lubricating, Graphite, E	161.001-1
W-B-101—Batteries and Cells; Dry, H	161.008-1; 161.010-1
WW-C-621—Couplings; Hose, Cotton (Rubberlined) and Linen (Unlined), E, and Amdt. 1.	162.027-1
Federal Standards and Test Method Standards: No. 141 Paint, Varnish, Lacquer, and Related Materials; Methods of Inspection, Sampling, and Testing, A.	164.018-5
No. 151—Metals, Test Methods, B, and Notice 2	160.062-1
No. 191—Textiles, Test Methods, A	160.002-1; 160.005-1; 160.009-1; 160.047-1; 160.052-1; 160.055-1; 160.060-1; 160.071-3
No. 595—Colors, A, and Notice 5	160.050-1; 160.009-1; 160.055-1
No. 751—Stitches, Seams, and Stitchings, A	160.002-1; 160.005-1; 160.009-1; 160.047-1; 160.048-1; 160.048-1; 160.052-1; 160.055-1; 160.060-1; 160.071-3
Military Specifications: MIL-B-18 Batteries, Dry, D, and Amdt. 2	161.001-1; 161.010-1
MIL-B-2766—Batt, Fibrous Glass, Lifesaving Equipment, B, and Interim Amdt. 1.	160.005-1; 160.047-1; 160.048-1
MIL-B-16444—Bronze, Hydraulic (ounce metal): castings, A, and Notice 1.	160.027-1

Naval Publications Forms Center—Continued	46 CFR
MIL-C-17415—Cloth, Coated and Webbing, Inflatable Boat and Miscellaneous Use, E, and Amdt. I.	160.051-1; 164.018-1
MIL-C-43006—Cloth Laminated, Vinyl-Nylon, High Strength, Flexible, E.	160.049-1; 160.055-1; 164.018-5
MIL-D-3716—Dessicants (Activated) for Dynamic Dehumidification, A, and Amdt. 2.	161.001-1
MIL-D-5531—Desalter Kit Sea water Mark Q, E	160.058-1
MIL-E-15090—Enamel, equipment, light gray (Formula No. 111), B, and Amdt. 2.	160.026-1
MIL-F-859—Fuel Oil, Boiler, E and Amdt. 2	164.015-1; 164.016-1
MIL-I-16923—Insulating Compound, Electrical Embedding, G, and Amdt. 1.	161.010-1
MIL-L-1204—Lamp, Safety, Flame, B	160.016-1
MIL-L-2648—Light, Marker, Distress, Floating Automatic Nonmagnetic, D, and Amdt. 2.	161.001-1
MIL-L-7178—Lacquer, Cellulose Nitrate, Glass for Aircraft Use, A, and Amdt. 1.	160.026-1
MIL-L-17653A—Life Preserver, Vest, Work Type, Unicellular Plastic, B, and Amdt. 3.	160.053-1
MIL-L-19496 (ships)—Lifeboat, CO_2 Inflatable Mark 5, Mod 1, 15-person Capacity, D, and Amdt. 1.	160.051-1
MIL-L-45505—Line-throwing Apparatuses, Rocket and Projectile Units, A.	160.040-1
MIL-M-15617—Mats, Fibrous Glass for Reinforcing Plastics, A, and Amdt. 1.	160.035-1
MIL-P-79—Plastic Rods and Tubes, Thermosetting, Laminated, C, and Amdt. 2.	160.001-1; 161.010-1
MIL-P-17549—Plastic Laminates, Fibrous Glass Reinforced, Marine Structural, C, and Amdt. 2.	160.035-1
MIL-P-18066—Plywood, Ship and Boat Construction, B	160.035-1
MIL-P-19644—Plastic Foam, Molded Polystyrene (Expanded Bend Type), C.	160.035-1
MIL-P-21929—Plastic Materials, Cellular Polyurethane, Foam-in-Place, Rigid (2 and 4 Pounds Per Cubic Foot), B, and Amdt. 1.	160.035-1
MIL-P-40619—Plastic Material, Cellular, Polystyrene (for Buoyancy Applications), A.	160.035.1; 164.013-1
MIL-R-900—Rubber Gasket Material, 45 Durometer Hardness, F	161.001-1
MIL-R-2765—Rubber Sheet, Strip, Extruded, and Molded Shapes, Synthetic, Oil Resistant, C.	161.001-1
MIL-R-7575—Resin, Polyester, Low-Pressure Laminating, C, and Amdt. 2.	160.035-1
MIL-R-16847—Ring Buoys, Lifesaving, Unicellular Plastic, E, and Amdt. 2.	160.050-1
MIL-R-21607—Resins, Polyester, Low-Pressure Laminating, Fire-retardant, D.	160.035-1; 164.018-5
MIL-R-23139—Rocket Motors, Surfaced Launched, Development and Qualification Requirements for, B.	160.040-1
MIL-S-18655—Signal, Smoke and Illumination, Marine, C	160.023-1
MIL-W-530—Webbing, Textile, Cotton, General Purpose, Natural or in Colors, F, and Amdt. 2.	160.002-1; 160.005-1; 160.047-1; 160.052-1; 160.055-1; 160.055-1

National Fire Protection Association

Batterymarch Park, Quincy, MA 02269

Material Approved for Incorporation by Reference

National Fire Protection Association—Continued	46 CFR
No. 255 Method of Test of Surface Burning Characteristics of Building Materials, 1972.	164.012–1
Underwriters Laboratories	
333 Pfingsten Road, Northbrook, IL 60062	
UL 62—Flexible Cord and Fixture Wire, 1980	161.006–1
UL 198B—Class H Fuses, 1975	161.004–1
UL 1191—First Edition Standard for Components of Personal Flotation Devices, 1977.	160.071–3

[46 FR 47949, Sept. 30, 1981]

BLANK PAGE

Table of CFR Titles and Chapters

(As of September 30, 1981)

Title 1—General Provisions

Chap.	
I	Administrative Committee of the Federal Register (Parts 1-49)
II	Office of the Federal Register (Parts 50-299)
III	Administrative Conference of the United States (Parts 300-399)
IV	Miscellaneous Agencies (Parts 400-499)

Title 2—[Reserved]

Title 3—The President

	Proclamations
	Executive Orders
	Presidential Documents Other Than Proclamations and Executive Orders
I	Executive Office of the President (Parts 100-199)

Title 4—Accounts

I	General Accounting Office (Parts 1-99)
II	Federal Claims Collection Standards (General Accounting Office—Department of Justice) (Parts 100-299)
III	General Accounting Office (CASB) (Parts 300-499)

Title 5—Administrative Personnel

I	Office of Personnel Management (Parts 1-1199)
II	Merit Systems Protection Board (Parts 1200-1299)
III	Office of Management and Budget (Parts 1300-1399)
IV	Advisory Committee on Federal Pay (Parts 1400-1499)
V	The International Organizations Employees Loyalty Board (Parts 1500-1599)
VII	Advisory Commission on Intergovernmental Relations (Parts 1700-1799)
IX	Appalachian Regional Commission (Parts 1900-1999)
XI	United States Soldiers' and Airmen's Home (Parts 2100-2199)
XIV	Federal Labor Relations Authority and Federal Service Impasses Panel (Parts 2400-2499)

Title 5—Administrative Personnel—Continued

Chap.	
XV	Office of Administration, Executive Office of the President (Parts 2500-2599)

Title 6—Economic Stabilization

Chap.	
VI	Assistant Secretary for Administration, Department of the Treasury (Parts 600-699)
VII	Council on Wage and Price Stability (Parts 700-799)

Title 7—Agriculture

Chap.	
	SUBTITLE A—Office of the Secretary of Agriculture (Parts 0-25a)
	SUBTITLE B—Regulations of the Department of Agriculture
I	Agricultural Marketing Service (Standards, Inspections, Marketing Practices), Department of Agriculture (Parts 26-209)
II	Food and Nutrition Service, Department of Agriculture (Parts 210-299)
III	Animal and Plant Health Inspection Service, Department of Agriculture (Parts 300-399)
IV	Federal Crop Insurance Corporation, Department of Agriculture (Parts 400-499)
V	Agricultural Research Service, Department of Agriculture (Parts 500-599)
VI	Soil Conservation Service, Department of Agriculture (Parts 600-699)
VII	Agricultural Stabilization and Conservation Service (Agricultural Adjustment), Department of Agriculture (Parts 700-799)
VIII	Federal Grain Inspection Service, Department of Agriculture (Parts 800-899)
IX	Agricultural Marketing Service (Marketing Agreements and Orders; Fruits, Vegetables, Nuts), Department of Agriculture (Parts 900-999)
X	Agricultural Marketing Service (Marketing Agreements and Orders; Milk), Department of Agriculture (Parts 1000-1199)
XI	Agricultural Marketing Service (Marketing Agreements and Orders; Miscellaneous Commodities), Department of Agriculture (Parts 1200-1299)
XII	Statistical Reporting Service (Agricultural Statistics), Department of Agriculture (Parts 1300-1399)
XIV	Commodity Credit Corporation, Department of Agriculture (Parts 1400-1499)
XV	Foreign Agricultural Service, Department of Agriculture (Parts 1500-1599)
XVI	Rural Telephone Bank, Department of Agriculture (Parts 1600-1699)
XVII	Rural Electrification Administration, Department of Agriculture (Parts 1700-1799)
XVIII	Farmers Home Administration, Department of Agriculture (Parts 1800-2099)

Title 7—Agriculture—Continued

Chap.	
XXI	Foreign Economic Development Service, Department of Agriculture (Parts 2100-2199)
XXIV	Board of Contract Appeals, Department of Agriculture (Parts 2400-2499)
XXV	Office of the General Sales Manager, Department of Agriculture (Parts 2500-2599)
XXVI	Office of the Inspector General, Department of Agriculture (Parts 2600-2699)
XXVIII	Food Safety and Quality Service, Department of Agriculture (Parts 2800-2899)
XXIX	Office of Energy, Department of Agriculture (Parts 2900-2999)
XXX	Office of Operations and Finance, Department of Agriculture (Parts 3000-3099)
XXXI	Office of Environmental Quality, Department of Agriculture (Parts 3100-3199)

Title 8—Aliens and Nationality

I	Immigration and Naturalization Service, Department of Justice (Parts 1-499)

Title 9—Animals and Animal Products

I	Animal and Plant Health Inspection Service, Department of Agriculture (Parts 1-199)
II	Agricultural Marketing Service (Packers and Stockyards), Department of Agriculture (Parts 200-299)
III	Food Safety and Quality Service, Meat and Poultry Inspection, Department of Agriculture (Parts 300-399)

Title 10—Energy

I	Nuclear Regulatory Commission (Parts 0-199)
II	Department of Energy (Parts 200-699)
III	Department of Energy (Parts 700-999)
X	Department of Energy (General Provisions) (Parts 1000-1099)
XV	Office of the Federal Inspector for the Alaska Natural Gas Transportation System (Parts 1500-1599)

Title 11—Federal Elections

I	Federal Election Commission (Parts 1-9099)

Title 12—Banks and Banking

I	Comptroller of the Currency, Department of the Treasury (Parts 1-199)
II	Federal Reserve System (Parts 200-299)
III	Federal Deposit Insurance Corporation (Parts 300-399)
IV	Export-Import Bank of the United States (Parts 400-499)

Title 12—Banks and Banking—Continued

Chap.	
V	Federal Home Loan Bank Board (Parts 500-599)
VI	Farm Credit Administration (Parts 600-699)
VII	National Credit Union Administration (Parts 700-799)
VIII	Federal Financing Bank (Parts 800-899)
XI	Federal Financial Institutions Examination Council (Parts 1100-1199)
XII	Depository Institutions Deregulation Committee (Parts 1200-1299)

Title 13—Business Credit and Assistance

I	Small Business Administration (Parts 1-199)
III	Economic Development Administration, Department of Commerce (Parts 300-399)
IV	Chrysler Corporation Loan Guarantee Board (Parts 400-499)
V	Regional Action Planning Commissions (Parts 500-599)

Title 14—Aeronautics and Space

I	Federal Aviation Administration, Department of Transportation (Parts 1-199)
II	Civil Aeronautics Board (Parts 200-399)
V	National Aeronautics and Space Administration (Parts 1200-1299)

Title 15—Commerce and Foreign Trade

	SUBTITLE A—Office of the Secretary of Commerce (Parts 0-19)
	SUBTITLE B—Regulations Relating to Commerce and Foreign Trade
I	Bureau of the Census, Department of Commerce (Parts 20-199)
II	National Bureau of Standards, Department of Commerce (Parts 200-299)
III	International Trade Administration, Department of Commerce (Parts 300-399)
IV	Foreign-Trade Zones Board (Parts 400-499)
V	United States Metric Board (Parts 500-599)
VI	Bureau of Industrial Economics, Department of Commerce (Parts 600-699)
VIII	Bureau of Economic Analysis, Department of Commerce (Parts 800-899)
IX	National Oceanic and Atmospheric Administration, Department of Commerce (Parts 900-999)
XII	United States Travel Service, Department of Commerce (Parts 1200-1299)
XIII	East-West Foreign Trade Board (Parts 1300-1999)

Title 15—Commerce and Foreign Trade—Continued

Chap.	
	SUBTITLE C—Regulations Relating to Foreign Trade Agreements
XX	Office of the United States Trade Representative (Parts 2000-2099)
	SUBTITLE D—Regulations Relating to Telecommunications and Information
XXIII	National Telecommunications and Information Administration, Department of Commerce (Parts 2300-2399)

Title 16—Commercial Practices

I	Federal Trade Commission (Parts 0-999)
II	Consumer Product Safety Commission (Parts 1000-1799)

Title 17—Commodity and Securities Exchanges

I	Commodity Futures Trading Commission (Parts 1-199)
II	Securities and Exchange Commission (Parts 200-399)

Title 18—Conservation of Power and Water Resources

I	Federal Energy Regulatory Commission, Department of Energy (Parts 1-399)
III	Delaware River Basin Commission (Parts 400-499)
IV	Office of Water Resources Research, Department of the Interior (Parts 500-599)
VI	Water Resources Council (Parts 700-799)
VIII	Susquehanna River Basin Commission (Parts 800-899)
XIII	Tennessee Valley Authority (Parts 1300-1399)

Title 19—Customs Duties

I	United States Customs Service, Department of the Treasury (Parts 1-199)
II	United States International Trade Commission (Parts 200-299)
III	International Trade Administration, Department of Commerce (Parts 300-399)

Title 20—Employees' Benefits

I	Office of Workers' Compensation Programs, Department of Labor (Parts 1-199)
II	Railroad Retirement Board (Parts 200-399)
III	Social Security Administration, Department of Health and Human Services (Parts 400-499)
IV	Employees' Compensation Appeals Board, Department of Labor (Parts 500-599)
V	Employment and Training Administration, Department of Labor (Parts 600-699)

Title 20—Employees' Benefits—Continued

Chap.	
VI	Employment Standards Administration, Department of Labor (Parts 700–799)
VII	Benefits Review Board, Department of Labor (Parts 800-899)
VIII	Joint Board for the Enrollment of Actuaries (Parts 900-999)

Title 21—Food and Drugs

I	Food and Drug Administration, Department of Health and Human Services (Parts 1-1299)
II	Drug Enforcement Administration, Department of Justice (Parts 1300-1399)

Title 22—Foreign Relations

I	Department of State (Parts 1-199)
II	Agency for International Development, International Development Cooperation Agency (Parts 200–299)
III	Peace Corps (Parts 300-399)
IV	International Joint Commission, United States and Canada (Parts 400–499)
V	International Communication Agency (Parts 500-599)
VI	United States Arms Control and Disarmament Agency (Parts 600-699)
VII	Overseas Private Investment Corporation (Parts 700-799)
VIII	Employee-Management Relations Commission (Parts 800-899)
IX	Foreign Service Grievance Board (Parts 900-999)
X	Inter-American Foundation (Parts 1000-1099)
XI	International Boundary and Water Commission, United States and Mexico, United States Section (Parts 1100-1199)
XII	United States International Development Cooperation Agency (Parts 1200-1299)
XIII	Board for International Broadcasting (Parts 1300-1399)
XIV	Foreign Service Labor Relations Board; Federal Labor Relations Authority; General Counsel of the Federal Labor Relations Authority; and the Foreign Service Impasse Disputes Panel (Parts 1400-1499)

Title 23—Highways

I	Federal Highway Administration, Department of Transportation (Parts 1-999)
II	National Highway Traffic Safety Administration and Federal Highway Administration, Department of Transportation (Parts 1200-1299)

Title 24—Housing and Urban Development

SUBTITLE A—Office of the Secretary, Department of Housing and Urban Development (Parts 0-99)

SUBTITLE B—Regulations Relating to Housing and Urban Development

Chap.	
I	Office of Assistant Secretary for Equal Opportunity, Department of Housing and Urban Development (Parts 100-199)
II	Office of Assistant Secretary for Housing—Federal Housing Commissioner, Department of Housing and Urban Development (Parts 200-299)
III	Government National Mortgage Association, Department of Housing and Urban Development (Parts 300-399)
IV	Office of Assistant Secretary for Housing Management, Department of Housing and Urban Development (Parts 400-499)
V	Office of Assistant Secretary for Community Planning and Development, Department of Housing and Urban Development (Parts 500-599)
VI	Office of Assistant Secretary for Community Planning and Development, Department of Housing and Urban Development (Parts 600-699)
VII	New Community Development Corporation, Department of Housing and Urban Development (Parts 700-799)
VIII	Low-Income Housing, Department of Housing and Urban Development (Parts 800-899)
IX	Office of Interstate Land Sales Registration, Department of Housing and Urban Development (Parts 1700-1799)
X	Solar Energy and Energy Conservation Bank, Department of Housing and Urban Development (Parts 1800-1899)
XV	Mortgage Insurance and Loan Programs Under the Emergency Homeowners' Relief Act, Department of Housing and Urban Development (Parts 2700-2799)
XX	Office of Assistant Secretary for Neighborhoods, Voluntary Associations and Consumer Protection, Department of Housing and Urban Development (Parts 3200-3699)
XXV	Neighborhood Reinvestment Corporation (Parts 4100-4199)

Title 25—Indians

I	Bureau of Indian Affairs, Department of the Interior (Parts 1-299)
II	Indian Arts and Crafts Board, Department of the Interior (Parts 300-399)
IV	Navajo and Hopi Indian Relocation Commission (Parts 700-799)

Title 26—Internal Revenue

Chap.	
I	Internal Revenue Service, Department of the Treasury (Parts 1-699)

Title 27—Alcohol, Tobacco Products and Firearms

I	Bureau of Alcohol, Tobacco and Firearms, Department of the Treasury (Parts 1-299)

Title 28—Judicial Administration

I	Department of Justice (Parts 0-199)
III	Federal Prison Industries, Department of Justice (Parts 300-399)
V	Bureau of Prisons, Department of Justice (Parts 500-599)

Title 29—Labor

	SUBTITLE A—Office of the Secretary of Labor (Parts 0-99)
	SUBTITLE B—Regulations Relating to Labor
I	National Labor Relations Board (Parts 100-199)
II	Office of the Assistant Secretary for Labor-Management Relations, Department of Labor (Parts 200-299)
III	National Railroad Adjustment Board (Parts 300-399)
IV	Office of Labor-Management Standards Enforcement, Department of Labor (Parts 400-499)
V	Wage and Hour Division, Department of Labor (Parts 500-899)
IX	Construction Industry Collective Bargaining Commission (Parts 900-999)
X	National Mediation Board (Parts 1200-1299)
XII	Federal Mediation and Conciliation Service (Parts 1400-1499)
XIV	Equal Employment Opportunity Commission (Parts 1600-1699)
XVII	Occupational Safety and Health Administration, Department of Labor (Parts 1900-1999)
XX	Occupational Safety and Health Review Commission (Parts 2200-2499)
XXV	Pension and Welfare Benefit Programs, Department of Labor (Parts 2500-2599)
XXVI	Pension Benefit Guaranty Corporation (Parts 2600-2699)
XXVII	Federal Mine Safety and Health Review Commission (Parts 2700-2799)

Title 30—Mineral Resources

I	Mine Safety and Health Administration, Department of Labor (Parts 1-199)
II	Geological Survey, Department of the Interior (Parts 200-299)
III	Board of Surface Mining and Reclamation Appeals, Department of the Interior (Parts 300-399)
VI	Bureau of Mines, Department of the Interior (Parts 600-699)

Title 30—Mineral Resources—Continued

Chap.	
VII	Office of Surface Mining Reclamation and Enforcement, Department of the Interior (Parts 700-999)

Title 31—Money and Finance: Treasury

	SUBTITLE A—Office of the Secretary of the Treasury (Parts 0-50)
	SUBTITLE B—Regulations Relating to Money and Finance
I	Monetary Offices, Department of the Treasury (Parts 51-199)
II	Fiscal Service, Department of the Treasury (Parts 200-399)
IV	Secret Service, Department of the Treasury (Parts 400-499)
V	Office of Foreign Assets Control, Department of the Treasury (Parts 500-599)
VI	Bureau of Engraving and Printing, Department of the Treasury (Parts 600-699)
VII	Federal Law Enforcement Training Center, Department of the Treasury (Parts 700-799)

Title 32—National Defense

	SUBTITLE A—Department of Defense
I	Office of the Secretary of Defense (Parts 1-499)
V	Department of the Army (Parts 500-699)
VI	Department of the Navy (Parts 700-799)
VII	Department of the Air Force (Parts 800-1099)
	SUBTITLE B—Other Regulations Relating to National Defense
XII	Defense Logistics Agency (Parts 1200-1299)
XVI	Selective Service System (Parts 1600-1699)
XIX	Central Intelligence Agency (Parts 1900-1999)
XX	Information Security Oversight Office (Parts 2000-2099)
XXI	National Security Council (Parts 2100-2199)
XXIV	Office of Science and Technology Policy (Parts 2400-2499)
XXVII	Office for Micronesian Status Negotiations (Parts 2700-2799)
XXVIII	Office of the Vice President of the United States (Parts 2800-2899)

Title 33—Navigation and Navigable Waters

I	Coast Guard, Department of Transportation (Parts 1-199)
II	Corps of Engineers, Department of the Army (Parts 200-399)
IV	Saint Lawrence Seaway Development Corporation, Department of Transportation (Parts 400-499)

Title 34—Education

SUBTITLE A—Office of the Secretary, Department of Education (Parts 1-99)

SUBTITLE B—Regulations of the Offices of the Department of Education

Chap.	
I	Office for Civil Rights, Department of Education (Parts 100-199)
II	Office of Elementary and Secondary Education, Department of Education (Parts 200-299)
III	Office of Special Education and Rehabilitative Services, Department of Education (Parts 300-399)
IV	Office of Vocational and Adult Education, Department of Education (Parts 400-499)
V	Office of Bilingual Education and Minority Languages Affairs, Department of Education (Parts 500-599)
VI	Office of Postsecondary Education, Department of Education (Parts 600-699)
VII	Office of Educational Research and Improvement, Department of Education (Parts 700-799)
VIII	Office of Education for Overseas Dependents, Department of Education (Parts 800-899) [Reserved]

Title 35—Panama Canal

I	Panama Canal Regulations (Parts 1-299)

Title 36—Parks, Forests, and Public Property

I	National Park Service, Department of the Interior (Parts 1-199)
II	Forest Service, Department of Agriculture (Parts 200-299)
III	Corps of Engineers, Department of the Army (Parts 300-399)
IV	American Battle Monuments Commission (Parts 400-499)
V	Smithsonian Institution (Parts 500-599)
VII	Library of Congress (Parts 700-799)
VIII	Advisory Council on Historic Preservation (Parts 800-899)
IX	Pennsylvania Avenue Development Corporation (Parts 900-999)
X	Commission of Fine Arts (Parts 1000-1099)
XI	Architectural and Transportation Barriers Compliance Board (Parts 1100-1199)

Title 37—Patents, Trademarks, and Copyrights

I	Patent and Trademark Office, Department of Commerce (Parts 1-199)
II	Copyright Office, Library of Congress (Parts 200-299)
III	Copyright Royalty Tribunal (Parts 300-399)

Title 38—Pensions, Bonuses, and Veterans' Relief

Chap.	
I	Veterans Administration (Parts 0-99)

Title 39—Postal Service

I	United States Postal Service (Parts 1-999)
III	Postal Rate Commission (Parts 3000-3099)

Title 40—Protection of Environment

I	Environmental Protection Agency (Parts 1-799)
IV	Low-Emission Vehicle Certification Board (Parts 1400-1499)
V	Council on Environmental Quality (Parts 1500-1599)

Title 41—Public Contracts and Property Management

	SUBTITLE A—Federal Procurement Regulations System
1	Federal Procurement Regulations (Parts 1-1—1-99)
3	Department of Health and Human Services (Parts 3-1—3-99)
4	Department of Agriculture (Parts 4-1—4-99)
5	General Services Administration (Part 5-1—5-99)
5A	Office of Acquisition Policy, General Services Administration (Parts 5A-1—5A-99)
5B	Office of Acquisition Policy, General Services Administration (Parts 5B-1—5B-99)
6	Department of State (Parts 6-1—6-99)
7	Agency for International Development, International Development Cooperation Agency (Parts 7-1—7-99)
8	Veterans Administration (Parts 8-1—8-99)
9	Department of Energy (Parts 9-1—9-99)
10	Department of the Treasury (Parts 10-1—10-99)
12	Department of Transportation (Parts 12-1—12-99)
13	Department of Commerce (Parts 13-1—13-99)
14	Department of the Interior (Parts 14-1—14-99)
14H	Bureau of Indian Affairs, Department of the Interior (Parts 14H-1—14H-99)
14R	Office of Water Research and Technology, Department of the Interior (Parts 14R-1—14R-99)
15	Environmental Protection Agency (Parts 15-1—15-99)
18	National Aeronautics and Space Administration (Parts 18-1—18-99)
19	International Communication Agency (Parts 19-1—19-99)
20	Nuclear Regulatory Commission (Parts 20-1—20-99)
22	Community Services Administration (Parts 22-1—22-99)
23	United States Arms Control and Disarmament Agency (Parts 23-1—23-99)
24	Department of Housing and Urban Development (Parts 24-1—24-99)
25	National Science Foundation (Parts 25-1—25-99)

Title 41—Public Contracts and Property Management—Continued

Chap.	
28	Department of Justice (Parts 28-1—28-99)
29	Department of Labor (Parts 29-1—29-99)
34	Department of Education (Parts 34-1—34-99)
44	Federal Emergency Management Agency (Parts 44-1—44-99)
	SUBTITLE B—Other Provisions Relating to Public Contracts
50	Public Contracts, Department of Labor (Parts 50-1—50-999)
51	Committee for Purchase from the Blind and Other Severely Handicapped (Parts 51-1—51-99)
60	Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor (Parts 60-1—60-99)
	SUBTITLE C—Federal Property Management Regulations System
101	Federal Property Management Regulations (Parts 101-1—101-99)
105	General Services Administration (Parts 105-1—105-999)
109	Department of Energy (Parts 109-1—109-99)
114	Department of the Interior (Parts 114-1—114-99)
115	Environmental Protection Agency (Parts 115-1—115-99)
128	Department of Justice (Parts 128-1—128-99)
	SUBTITLE D—Other Provisions Relating to Property Management [Reserved]

Title 42—Public Health

I	Public Health Service, Department of Health and Human Services (Parts 1-199)
III	Saint Elizabeths Hospital, Department of Health and Human Services (Parts 300-399)
IV	Health Care Financing Administration, Department of Health and Human Services (Parts 400-499)

Title 43—Public Lands: Interior

	SUBTITLE A—Office of the Secretary of the Interior (Parts 1-199)
	SUBTITLE B—Regulations Relating to Public Lands
I	Bureau of Reclamation, Department of the Interior (Parts 200-499)
II	Bureau of Land Management, Department of the Interior (Parts 1600-9999)

Title 44—Emergency Management and Assistance

I	Federal Emergency Management Agency (Parts 0-399)
IV	Department of Commerce and Department of Transportation (Parts 400-499)

Title 45—Public Welfare

Subtitle A—Department of Health and Human Services (Parts 1-99)

Subtitle B—Regulations Relating to Public Welfare

Chap.	
II	Office of Family Assistance (Assistance Programs), Department of Health and Human Services (Parts 200-299)
III	Office of Child Support Enforcement (Child Support Enforcement Program), Department of Health and Human Services (Parts 300-399)
IV	Office of Refugee Resettlement, Department of Health and Human Services (Parts 400-499)
V	Foreign Claims Settlement Commission of the United States, Department of Justice (Parts 500-599)
VI	National Science Foundation (Parts 600-699)
VII	Commission on Civil Rights (Parts 700-799)
VIII	Office of Personnel Management (Parts 800-899)
X	Community Services Administration (Parts 1000-1099)
XI	National Foundation on the Arts and the Humanities (Parts 1100-1199)
XII	ACTION (Parts 1200-1299)
XIII	Office of Human Development Services, Department of Health and Human Services (Parts 1300-1399)
XVI	Legal Services Corporation (Parts 1600-1699)
XVII	National Commission on Libraries and Information Science (Parts 1700-1799)
XVIII	Harry S. Truman Scholarship Foundation (Parts 1800-1899)
XIX	National Commission on the Observance of International Women's Year (Parts 1900-1999)
XXI	Commission of Fine Arts (Parts 2100-2199)

Title 46—Shipping

I	Coast Guard, Department of Transportation (Parts 1-199)
II	Maritime Administration, Department of Transportation (Parts 200-399)
III	Coast Guard (Great Lakes Pilotage), Department of Transportation (Parts 400-499)
IV	Federal Maritime Commission (Parts 500-599)

Title 47—Telecommunication

I	Federal Communications Commission (Parts 0-199)
II	Office of Science and Technology Policy and National Security Council (Parts 200-299)

Title 48—[Reserved]

Title 49—Transportation

SUBTITLE A—Office of the Secretary of Transportation (Parts 1-99)

SUBTITLE B—Other Regulations Relating to Transportation

Chap.

I Research and Special Programs Administration, Department of Transportation (Parts 100-199)

II Federal Railroad Administration, Department of Transportation (Parts 200-299)

III Federal Highway Administration, Department of Transportation (Parts 300-399)

IV Coast Guard, Department of Transportation (Parts 400-499)

V National Highway Traffic Safety Administration, Department of Transportation (Parts 500-599)

VI Urban Mass Transportation Administration, Department of Transportation (Parts 600-699)

VIII National Transportation Safety Board (Parts 800-899)

IX United States Railway Association (Parts 900-999)

X Interstate Commerce Commission (Parts 1000-1399)

Title 50—Wildlife and Fisheries

I United States Fish and Wildlife Service, Department of the Interior (Parts 1-199)

II National Marine Fisheries Service, National Oceanic and Atmospheric Administration, Department of Commerce (Parts 200-299)

III International Regulatory Agencies (Fishing and Whaling) (Parts 300-399)

IV Joint Regulations (United States Fish and Wildlife Service, Department of the Interior and National Marine Fisheries Service, National Oceanic and Atmospheric Administration, Department of Commerce); Endangered Species Committee Regulations (Parts 400-499)

V Marine Mammal Commission (Parts 500-599)

VI Fishery Conservation and Management, National Oceanic and Atmospheric Administration, Department of Commerce (Parts 600-699)

CFR Index and Finding Aids

Subject/Agency Index

List of CFR Titles, Chapters, Subchapters, and Parts

Parallel Tables of Statutory Authorities and Rules

Acts Requiring Publication in the Federal Register

Alphabetical List of Agencies Appearing in the CFR

(As of September 30, 1981)

Agency	CFR Title, Subtitle or Chapter
ACTION	45, XII
Acquisition Policy, Office of	41, 5A, 5B
Administrative Committee of the Federal Register	1, I
Administrative Conference of the United States	1, III
Advisory Commission on Intergovernmental Relations	5, VII
Advisory Committee on Federal Pay	5, IV
Advisory Council on Historic Preservation	36, VIII
Agency for International Development	22, II; 41, 7
Agricultural Marketing Service	7, I, IX, X, XI; 9, II
Agricultural Research Service	7, V
Agricultural Stabilization and Conservation Service	7, VII
Agriculture Department	
Agricultural Marketing Service	7, I, IX, X, XI; 9, II
Agricultural Research Service	7, V
Agricultural Stabilization and Conservation Service	7, VII
Animal and Plant Health Inspection Service	7, III; 9, I, III
Commodity Credit Corporation	7, XIV
Contract Appeals, Board of	7, XXIV
Energy, Office of	7, XXIX
Environmental Quality, Office of	7, XXXI
Farmers Home Administration	7, XVIII
Federal Crop Insurance Corporation	7, IV
Federal Grain Inspection Service	7, VIII
Federal Procurement Regulations System	41, 4
Food and Nutrition Service	7, II
Food Safety and Quality Service	7, XXVIII; 9, III
Foreign Agricultural Service	7, XV
Foreign Economic Development Service	7, XXI
Forest Service	36, II
General Sales Manager, Office of	7, XXV
Inspector General, Office of	7, XXVI
Operations and Finance, Office of	7, XXX
Rural Electrification Administration	7, XVII
Rural Telephone Bank	7, XVI
Secretary of Agriculture, Office of	7, Subtitle A
Soil Conservation Service	7, VI
Statistical Reporting Service	7, XII
Air Force Department	32, VII
Alaska Natural Gas Transportation System, Office of the Federal Inspector	10, XV
Alcohol, Tobacco and Firearms, Bureau of	27, I
American Battle Monuments Commission	36, IV
Animal and Plant Health Inspection Service	7, III; 9, I
Appalachian Regional Commission	5, IX
Architectural and Transportation Barriers Compliance Board	36, XI
Arms Control and Disarmament Agency, U.S.	22, VI; 41, 23
Army Department	32, V
Engineers, Corps of	33, II; 36, III
Benefits Review Board	20, VII

Agency	CFR Title, Subtitle or Chapter
Bilingual Education and Minority Languages Affairs, Office of	34, V
Blind and Other Severely Handicapped, Committee for Purchase from	41, 51
Board for International Broadcasting	22, XIII
Budget, Office of Management and	5, III
Census Bureau	15, I
Central Intelligence Agency	32, XIX
Child Support Enforcement, Office of	45, III
Chrysler Corporation Loan Guarantee Board	13, IV
Civil Aeronautics Board	14, II
Civil Rights Commission	45, VII
Civil Rights, Office for (Education Department)	34, I
Claims Collection Standards, Federal	4, II
Coast Guard	33, I; 46, I, III; 49, IV
Commerce Department	
Census Bureau	15, I
Economic Analysis, Bureau of	15, VIII
Economic Development Administration	13, III
Endangered Species Committee	50, IV
Federal Procurement Regulations System	41, 13
Fishery Conservation and Management	50, VI
Industrial Economics, Bureau of	15, VI
International Trade Administration	15, III; 19, III
National Bureau of Standards	15, II
National Defense	44, IV
National Marine Fisheries Service	50, II, IV
National Oceanic and Atmospheric Administration	15, IX; 50, II, IV
National Telecommunications and Information Administration	15, XXIII
Patent and Trademark Office	37, I
Secretary of Commerce, Office of	15, Subtitle A
United States Travel Service	15, XII
Commission on the Review of the National Policy Toward Gambling	1, IV
Committee for Purchase from Blind and Other Severely Handicapped	41, 51
Commodity Credit Corporation	7, XIV
Commodity Futures Trading Commission	17, I
Community Planning and Development, Office of Assistant Secretary for	24, V, VI
Community Services Administration	41, 22; 45, X
Comptroller of the Currency	12, I
Construction Industry Collective Bargaining Commission	29, IX
Consumer Product Safety Commission	16, II
Contract Appeals, Board of	7, XXIV
Copyright Office	37, II
Copyright Royalty Tribunal	37, III
Council on Environmental Quality	40, V
Council on Wage and Price Stability	6, VII
Customs Service, United States	19, I
Defense Department	32, Subtitle A
Air Force Department	32, VII
Army Department	32, V; 33, II; 36, III
Defense Civil Preparedness Agency	32, XVIII
Engineers, Corps of	33, II; 36, III
Navy Department	32, VI
Secretary of Defense, Office of	32, I
Defense Logistics Agency	32, XII
Defense Manpower Commission	1, IV
Delaware River Basin Commission	18, III
Depository Institutions Deregulation Committee	12, XII
Drug Enforcement Administration	21, II
East-West Foreign Trade Board	15, XIII
Economic Analysis, Bureau of	15, VIII
Economic Development Administration	13, III

Agency	CFR Title, Subtitle or Chapter
Education, Department of	
Bilingual Education and Minority Languages Affairs, Office of	34, V
Civil Rights, Office for	34, I
Education for Overseas Dependents, Office of	34, VIII
Educational Research and Improvement, Office of	34, VII
Elementary and Secondary Education, Office of	34, II
Federal Procurement Regulations System	41, 34
Postsecondary Education, Office of	34, VI
Secretary of Education, Office of	34, Subtitle A
Special Education and Rehabilitative Services, Office of	34, III
Vocational and Adult Education, Office of	34, IV
Education for Overseas Dependents, Office of	34, VIII
Educational Research and Improvement, Office of	34, VII
Elementary and Secondary Education, Office of	34, II
Employee Benefits Security, Office of	29, XXV
Employee-Management Relations Commission	22, VIII
Employees' Compensation Appeals Board	20, IV
Employees Loyalty Board, International Organizations	5, V
Employment and Training Administration	20, V
Employment Standards Administration	20, VI
Endangered Species Committee	50, IV
Energy, Department of	10, II, III, X; 41, 109
Federal Energy Regulatory Commission	18, I
Federal Procurement Regulations System	41, 9
Energy, Office of, Department of Agriculture	7, XXIX
Engineers, Corps of	33, II; 36, III
Engraving and Printing, Bureau of	31, VI
Environmental Protection Agency	40, I; 41, 15, 115
Environmental Quality, Office of (Agriculture Department)	7, XXXI
Equal Employment Opportunity	41, 60
Equal Employment Opportunity Commission	29, XIV
Equal Opportunity, Office of Assistant Secretary for	24, I
Executive Office of the President	3, I
Administration, Office of	5, XV
Export-Import Bank of the United States	12, IV
Family Assistance, Office of	45, II
Farm Credit Administration	12, VI
Farmers Home Administration	7, XVIII
Federal Aviation Administration	14, I
Federal Claims Collection Standards	4, II
Federal Communications Commission	47, I
Federal Contract Compliance, Office of	41, 60
Federal Crop Insurance Corporation	7, IV
Federal Deposit Insurance Corporation	12, III
Federal Election Commission	11, I
Federal Emergency Management Agency	41, 44; 44, I
Federal Energy Regulatory Commission	18, I
Federal Financial Institutions Examination Council	12, XI
Federal Financing Bank	12, VIII
Federal Grain Inspection Service	7, VIII
Federal Highway Administration	23, I, II; 49, III
Federal Home Loan Bank Board	12, V
Federal Inspector for the Alaska Natural Gas Transportation System, Office of	10, XV
Federal Labor Relations Authority, and General Counsel of the Federal Labor Relations Authority	5, XIV; 22,XIV
Federal Law Enforcement Training Center	31, VII
Federal Maritime Commission	46, IV
Federal Mediation and Conciliation Service	29, XII
Federal Mine Safety and Health Review Commission	29, XXVII
Federal Pay, Advisory Committee on	5, IV
Federal Prison Industries	28, III
Federal Procurement Regulations	41, I
Federal Procurement Regulations System	41, Subtitle A
Federal Property Management Regulations	41, 101

Agency	CFR Title, Subtitle or Chapter
Federal Property Management Regulations System	41, Subtitle C
Federal Railroad Administration	49, II
Federal Register, Administrative Committee of	1, I
Federal Register, Office of	1, II
Federal Reserve System	12, II
Federal Services Impasses Panel	5, XIV
Federal Trade Commission	16, I
Fine Arts Commission	36, X; 45, XXI
Fiscal Service	31, II
Fish and Wildlife Service, United States	50, I, IV
Fishery Conservation and Management	50, VI
Fishing and Whaling, International Regulatory Agencies	50, III
Food and Drug Administration	21, I
Food and Nutrition Service	7, II
Food Safety and Quality Service,	7, XXVIII; 9, III
Foreign Agricultural Service	7, XV
Foreign Assets Control, Office of	31, V
Foreign Claims Settlement Commission of United States	45, V
Foreign Economic Development Service	7, XXI
Foreign Service Grievance Board	22, IX
Foreign Service Impasse Disputes Panel	22, XIV
Foreign Service Labor Relations Board	22, XIV
Foreign-Trade Zones Board	15, IV
Forest Service	36, II
General Accounting Office	4, I, II, III
General Sales Manager, Office of	7, XXV
General Services Administration	41, 5
Acquisition Policy, Office of	41, 5A, 5B
Federal Procurement Regulations System	41, 1, 5A, 5B
Federal Property Management Regulations System	41, 101, 105
Geological Survey	30, II
Government National Mortgage Association	24, III
Great Lakes Pilotage	46, III
Harry S Truman Scholarship Foundation	45, XVIII
Health and Human Services, Department of	45, Subtitle A
Child Support Enforcement, Office of	45, III
Family Assistance, Office of	45, II
Federal Procurement Regulations System	41, 3
Food and Drug Administration	21, I
Harry S Truman Scholarship Foundation	45, XVIII
Health Care Financing Administration	42, IV
Human Development Office	45, XIII
Public Health Service	42, I
Refugee Resettlement Office	45, IV
St. Elizabeths Hospital	42, III
Social Security Administration	20, III
Health Care Financing Administration	42, IV
Housing and Urban Development, Department of	
Community Planning and Development, Office of Assistant Secretary for	24, V, VI
Equal Opportunity, Office of Assistant Secretary for	24, I
Federal Procurement Regulations System	41, 24
Government National Mortgage Association	24, III
Housing—Federal Housing Commissioner, Office of Assistant Secretary for	24, II
Housing Management, Office of Assistant Secretary for	24, IV
Interstate Land Sales Registration, Office of	24, IX
Low-Income Housing	24, VIII
Mortgage Insurance and Loan Programs Under Emergency Homeowners' Relief Act	24, XV
Neighborhoods, Voluntary Associations and Consumer Protection, Office of Assistant Secretary for	24, XX
New Community Development Corporation	24, VII
Secretary, Office of	24, Subtitle A
Solar Energy and Energy Conservation Bank	24, X

Agency	CFR Title, Subtitle or Chapter
Housing—Federal Housing Commissioner, Office of Assistant Secretary for	24, II
Housing Management, Office of Assistant Secretary for	24, IV
Human Development Services Office	45, XIII
Immigration and Naturalization Service	8, I
Indian Affairs, Bureau of	25, I; 41, 14H
Indian Arts and Crafts Board	25, II
Industrial Economics, Bureau of, Commerce Department	15, VI
Information Agency, United States	22, V; 41, 19
Information Security Oversight Office	32, XX
Inspector General, Office of, Agriculture Department	7, XXVI
Inter-American Foundation	22, X
Intergovernmental Relations, Advisory Commission on	5, VII
Interior Department	
Endangered Species Committee	50, IV
Federal Procurement Regulations System	41, 14
Federal Property Management Regulations System	41, 114
Fish and Wildlife Service, United States	50, I, IV
Geological Survey	30, II
Indian Affairs, Bureau of	25, I; 41, 14H
Indian Arts and Crafts Board	25, II
Land Management Bureau	43, II
Mines, Bureau of	30, VI
National Park Service	36, I
Reclamation Bureau	43, I
Secretary of the Interior, Office of	43, Subtitle A
Surface Mining and Reclamation Appeals, Board of	30, III
Surface Mining Reclamation and Enforcement, Office of	30, VII
United States Fish and Wildlife Service	50, I, IV
Water Research and Technology, Office of	41, 14R
Water Resources Research, Office of	18, IV
Internal Revenue Service	26, I
International Boundary and Water Commission, United States and Mexico	22, XI
International Communication Agency	22, V; 41, 19
International Development, Agency for	22, II; 41, 7
International Development Cooperation Agency	22, II; 41, 7
International Joint Commission, United States and Canada	22, IV
International Organizations Employees Loyalty Board	5, V
International Regulatory Agencies (Fishing and Whaling)	50, III
International Trade Administration	15, III; 19, III
International Trade Commission, United States	19, II
Interstate Commerce Commission	49, X
Interstate Land Sales Registration, Office of	24, IX
Joint Board for the Enrollment of Actuaries	20, VIII
Justice Department	28, I; 41, 128
Drug Enforcement Administration	21, II
Federal Claims Collection Standards	4, II
Federal Prison Industries	28, III
Federal Procurement Regulations System	41, 28
Foreign Claims Settlement Commission of the United States	45, V
Immigration and Naturalization Service	8, I
Prisons, Bureau of	28, V
Labor Department	
Benefits Review Board	20, VII
Employees' Compensation Appeals Board	20, IV
Employment and Training Administration	20, V
Employment Standards Administration	20, VI
Federal Contract Compliance, Office of	41, 60
Federal Procurement Regulations System	41, 29, 50
Labor-Management Relations, Office of the Assistant Secretary	29, II
Labor-Management Standards Enforcement, Office of	29, IV
Mine Safety and Health Administration	30, I
Occupational Safety and Health Administration	29, XVII

Agency	CFR Title, Subtitle or Chapter
Pension and Welfare Benefit Programs	29, XXV
Public Contracts	41, 50
Secretary of Labor, Office of	29, Subtitle A
Wage and Hour Division	29, V
Worker's Compensation Programs, Office of	20, I
Labor Management Relations, Office of Assistant Secretary	29, II
Labor-Management Standards Enforcement, Office of	29, IV
Land Management, Bureau of	43, II
Legal Services Corporation	45, XVI
Library of Congress	36, VII
Copyright Office	37, II
Low-Emission Vehicle Certification Board	40, IV
Low-Income Housing, Department of Housing and Urban Development	24, VIII
Management and Budget, Office of	5, III
Marine Mammal Commission	50, V
Maritime Administration	46, II
Merit Systems Protection Board	5, II
Micronesian Status Negotiations, Office for	32, XXVII
Mine Safety and Health Administration	30, I
Mines, Bureau of	30, VI
Miscellaneous Agencies	1, IV
Monetary Offices	31, I
Mortgage Insurance and Loan Programs Under the Emergency Homeowners' Relief Act, Department of Housing and Urban Development	24, XV
National Aeronautics and Space Administration	14, V; 41, 18
National Bureau of Standards	15, II
National Commission on Libraries and Information Science	45, XVII
National Commission on the Observance of International Women's Year	45, XIX
National Credit Union Administration	12, VII
National Foundation on the Arts and the Humanities	45, XI
National Highway Traffic Safety Administration	23, II; 49, V
National Labor Relations Board	29, I
National Marine Fisheries Service	50, II, IV
National Mediation Board	29, X
National Oceanic and Atmospheric Administration	15, IX; 50, II, VI
National Park Service	36, I
National Railroad Adjustment Board	29, III
National Science Foundation	45, VI; 41, 25
National Security Council	32, XXI
National Security Council and Office of Science and Technology Policy	47, II
National Telecommunications and Information Administration	15, XXIII
National Transportation Safety Board	49, VIII
Navajo and Hopi Indian Relocation Commission	25, IV
Navy Department	32, VI
Neighborhood Reinvestment Corporation	24, XXV
Neighborhoods, Voluntary Associations and Consumer Protection, Office of Assistant Secretary for	29, XX
New Community Development Corporation	24, VII
Nuclear Regulatory Commission	10, I; 41, 20
Occupational Safety and Health Administration	29, XVII
Occupational Safety and Health Review Commission	29, XX
Overseas Private Investment Corporation	22, VII
Panama Canal Regulations	35, I
Patent and Trademark Office	37, I
Peace Corps	22, III
Pennsylvania Avenue Development Corporation	36, IX
Pension Benefit Guaranty Corporation	29, XXVI
Pension and Welfare Benefit Programs, Department of Labor	29, XXV
Personnel Management, Office of	5, I; 45, VIII
Postal Rate Commission	39, III

Agency	CFR Title, Subtitle or Chapter
Postal Service, United States	39, I
Postsecondary Education, Office of	34, VI
President's Commission on White House Fellowships	1, IV
Presidential Documents	3
Prisons, Bureau of	28, V
Privacy Protection Study Commission	1, IV
Procurement Regulations System, Federal	41, Subtitle A
Property Management Regulations System, Federal	41, Subtitle C
Public Contracts, Department of Labor	41, 50
Public Health Service	42, I
Railroad Retirement Board	20, II
Railway Association, United States	49, IX
Reclamation Bureau	43, I
Refugee Resettlement Office	45, IV
Regional Action Planning Commissions	13, V
Research and Special Programs Administration	49, I
Rural Electrification Administration	7, XVII
Rural Telephone Bank	7, XVI
Saint Elizabeths Hospital	42, III
Saint Lawrence Seaway Development Corporation	33, IV
Science and Technology Policy, Office of	32, XXIV
Science and Technology Policy, Office of, and National Security Council	47, II
Secret Service	31, IV
Securities and Exchange Commission	17, II
Selective Service System	32, XVI
Small Business Administration	13, I
Smithsonian Institution	36, V
Social Security Administration	20, III
Soil Conservation Service	7, VI
Solar Energy and Energy Conservation Bank, Department of HUD	24, X
Soldiers' and Airmen's Home, United States	5, XI
Special Education and Rehabilitative Services, Office of	34, III
Special Representative for Trade Negotiations, Office of	15, XX
State Department	22, I
Federal Procurement Regulations System	41, 6
Statistical Reporting Service, Agriculture Department	7, XII
Surface Mining and Reclamation Appeals, Board of	30,III
Susquehanna River Basin Commission	18, VIII
Tennessee Valley Authority	18, XIII
Trade Representative, United States, Office of	15, XX
Transportation, Department of	
Coast Guard	33, I; 46, I, III; 49, IV
Federal Aviation Administration	14, I
Federal Highway Administration	23, I, II; 49, III
Federal Procurement Regulations System	41, 12
Federal Railroad Administration	49, II
Highway Safety Program Standards	23, II
Maritime Administration	46, II
National Defense	44, IV
National Highway Traffic Safety Administration	23, II; 49, V
Research and Science Programs Administration	49, I
Saint Lawrence Seaway Development Corporation	33, IV
Secretary, Office of	49, Subtitle A
Urban Mass Transportation Administration	49, VI
Travel Service, United States	15, XII
Treasury Department	
Administration, Assistant Secretary for	6, VI
Alcohol, Tobacco and Firearms, Bureau of	27, I
Comptroller of the Currency	12, I
Customs Service, United States	19, I
Engraving and Printing, Bureau of	31, VI
Federal Law Enforcement Training Center	31, VII
Federal Procurement Regulations System	41, 10
Fiscal Service	31, II

Agency	CFR Title, Subtitle or Chapter
Foreign Assets Control, Office of	31, V
Internal Revenue Service	26, I
Monetary Offices	31, I
Secret Service	31, IV
Secretary of the Treasury, Office of	31, Subtitle A
Truman, Harry S, Scholarship Foundation	45, XVIII
United States and Canada, International Joint Commission	22, IV
United States Arms Control and Disarmament Agency	22, VI; 41, 23
United States Customs Service	19, I
United States Fish and Wildlife Service	50, I, IV
United States International Development Cooperation Agency	22, XII
United States International Trade Commission	19, II
United States Metric Board	15, V
United States Postal Service	39, I
United States Railway Association	49, IX
United States Soldiers' and Airmen's Home	5, XI
United States Trade Representative, Office of	15, XX
United States Travel Service	15, XII
Urban Mass Transportation Administration	49, VI
Veterans Administration	38, I; 41, 8
Vice President of the United States, Office of	32, XXVIII
Vocational and Adult Education, Office of	34, IV
Wage and Hour Division	29, V
Water Research and Technology, Office of	41, 14R
Water Resources Council	18, VI
Water Resources Research, Office of	18, IV
Welfare-Pension Reports, Office of Labor-Management and	29, IV
Workers' Compensation Programs, Office of	20, I

List of CFR Sections Affected

All changes in this volume of the Code of Federal Regulations which were made by documents published in the FEDERAL REGISTER since January 1, 1973, are enumerated in the following list. Entries indicate the nature of the changes effected. Page numbers refer to FEDERAL REGISTER pages. The user should consult the entries for chapters and parts as well as sections for revisions.

For the period before January 1, 1973, see the "List of CFR Sections Affected, 1949-1963, and 1964-1972," published in three separate volumes.

1973

46 CFR

38 FR Page

157.01-10 (c)(1) amended............5750
157.10-83 Added............5750
157.10-85 Added............5750
157.30-45 Added............5750
160 Subpart 160.009 heading revised............8118
  Subpart 160.047 heading revised............8119
  Subpart 160.048 heading revised............8119
  Subpart 160.049 heading revised............8119
  Subpart 160.052 heading revised............8120
  Subpart 160.060 heading revised............8122
  Subpart 160.064 heading revised............8122
160.002-1 (d) added............8118
160.002-2 Revised............8118
160.002-6. Revised............8118
160.005-1 (d) added............8118
160.005-2 Revised............8118
160.005-6 Revised............8118
160.009-1 (d) added............8118
160.009-2 (a) revised............8118
160.009-3 (a) revised; (a-1) added............8118
160.009-4 Heading, (a), and (b)(4) revised............8118
160.009-6 Revised............8118
160.047-1 (d) revised............8119
160.047-2 Revised............8119
160.047-6 Revised............8119
160.048-1 (d) revised............8119
160.048-6 (a) revised............8119

46 CFR—Continued

38 FR Page

160.048-7 (a) amended; (a)(1) removed............8119
160.048-7a Added............8119
160.049-1 (d) revised............8119
160.049-4 (c) revised............8119
160.049-6 (a) revised............8119
160.049-7 (a) amended; (a)(1) removed............8119
160.049-7a Added............8119
160.050-1 (d) added............8120
  (d) correctly designated as (c)....21784
160.050-6 Revised............8120
160.051-6 (f)(3) corrected............5338
160.051-7 (c)(8) corrected............5338
160.052-1 (d) revised............8120
160.052-2 Revised............8120
160.052-3 Heading revised............8120
160.052-4 Heading and (a) revised............8120
160.052-5 Heading revised............8120
160.052-6 Revised............8120
160.052-7 Heading, (c), heading, and (g) revised............8120
160.052-8 Revised............8120
160.052-9 Introductory text of (a) revised............8120
160.053-1 (c) added............8120
160.053-5 (a) revised............8121
160.055-1 (d) added............8121
160.055-2 Revised............8121
160.055-3 Heading revised............8121
160.055-4 Revised............8121
160.055-5 Heading, (b), and (c) revised............8121
160.055-6 Revised............8121
160.055-7 Heading and (i) revised............8121
160.055-8 Revised............8121

46 CFR—Continued

	38 FR Page
160.055-9 Heading, (b), and (c) revised; (b-1) and (c-1) added	8121
160.060-1 (d) revised	8122
160.060-2 Revised	8122
160.060-3 Heading revised	8122
160.060-4 Heading and (a) revised	8122
160.060-5 Heading revised	8122
160.060-6 Revised	8122
160.060-7 Heading, (c) heading, and (g) revised	8122
160.060-8 Revised	8122
160.064-4 (a) revised	8122
160.064-5 Revised	8123
160.064-5a Added	8123
160.064-5b Added	8123
160.064-7 Revised	8123
162.001-2 (a) amended	17230
162.018-3 (b) revised	17230
162.028-3 (c) (5) and (6) and (g) revised	6880
162.028-7 Revised	6880
162.028-8 (a)(5) added	6880
164.009-5 Added	6881

1973–1974

(Regulations published from October 1, 1973 through September 30, 1974)

46 CFR

	38 (39*) FR Page
160.015-3 *(j)(1) removed; (1) amended	11273
160.035-5 *Introductory text of (a)(3) revised	12747
160.047-3 *(g) removed	20684
160.047-3a *Added	20684
160.051-1 *(c) added	9669
160.051-5 *(c)(4) amended; (e)(11) revised	9669
160.051-7 (b)(5) revised	31297
160.052-3 *(e) removed	20684
160.052-3a *Added	20684
160.060-3 *(e) removed	20684
160.060-3a *Added	20684
161.011-1—161.011-10 (Subpart 161.011) *Added	10139
162.028-3 (j)(1) removed	27354
162.039-3 (h) removed	27354

Note: Asterisk (*) identifies changes published in 1974.

1974–1975

(Regulations published from October 1, 1974 through September 30, 1975)

46 CFR

	39 (40†) FR Page
160.062-2 (c) amended	†4422
160.062-4 (c), (d) (2), (3), and (4), and (e) amended; (f) revised	†4422
160.062-6 (b) revised	†4422
160.062-7 Added	†4422
160.062-8 Added	†4422
160.064-1—160.064-9 (Subpart 160.064) Heading revised	36967
160.064-2 (a), (b), (c) amended; (d) added	36967
160.064-3 (a), (b), and (e) amended; (d) revised	36967
160.064-4 (a) amended	36967
160.064-6 (a) amended	36967
160.064-7 (a) amended	36967
160.064-8 (a) amended	36967

1975–1976

(Regulations published from October 1, 1975, through September 30, 1976)

46 CFR

	40 (41Δ) FR Page
160.002-5 (g) amended	Δ10437
160.005-5 (g) amended	Δ10437
160.006-5 (b) amended	Δ10437
160.009-5 (a) amended	Δ10437
160.009-6 (a) and (b) amended	Δ10437
160.010-7 (j) amended	Δ10437
160.010-8 (a) amended	Δ10437
160.015-5 (d) amended	Δ10437
160.018-8 (a) amended	Δ10437
160.021-4 (o) amended	Δ10437
160.022-4 (n) amended	Δ10437
160.024-4 (m) amended	Δ10437
160.026-6 (g) amended	Δ10437
160.027-7 (j) amended	Δ10437
160.027-8 (a) amended	Δ10437
160.031-6 (a) amended	Δ10437
160.032-5 (a)(1) and (d) amended	Δ10437
160.035-3 (u)(7)(iv) amended	Δ10437
160.035-13 (c)(1) amended	Δ10437
160.036-4 (m) amended	Δ10437
160.037-4 (p) amended	Δ10437
160.039-5 (a) amended	Δ10437
160.040-5 (d) amended	Δ10437

Note: Symbol (†) refers to 1975 page numbers.

Note: Symbol (Δ) refers to 1976 page numbers.

46 CFR—Continued

40 (41Δ) FR
Page

160.050-6 (a) amended.......Δ10437
160.051-6 (e) amended.......Δ10437
160.051-8 (a) amended.......Δ10437
160.055-7 (g) amended.......Δ10437
160.057-4 (m) amended.......Δ10437
160.062-4 (f)(1)(iii) and (5)(ii) amended.......Δ10437
160.062-5 (a)(2) and (b)(1) and (2) amended.......Δ10437
163.001-7 (a) amended.......Δ10437
164.009-1—164.009-25 (Subpart 164.009) Revised.......Δ41701

1976–1977

No amendments published.

1977–1978

(Regulations published from October 1, 1977 through September 30, 1978)

46 CFR

42 (43†) FR
Page

160.001-1 Revised.......†27152
160.001-2 (j) and table added.......†27152
160.001-3 (a) amended.......†27154
160.002-1
  Heading, (a) introductory text, (1), (2), and (3) revised.......†27153
  (c) amended; (d) removed.......†27154
160.002-3 (b) amended and (i) revised.......†27153
  (b) amended.......†27154
160.002-5 Footnote added.......†9772
160.002-6 (b) revised.......†9770
160.002-7 (a) amended.......†27154
160.005-1
  Heading and (a) revised.......†27153
  (c) amended; (d) removed.......†27154
160.005-3 (i) revised.......†27153
  (b) amended.......†27154
160.005-5 Footnote added.......†9772
160.005-6 (b) revised.......†9770
160.009-1
  Heading, (a) introductory text, (1), and (2) revised.......†27153
  (c) amended; (d) removed.......†27154
160.009-3 (b) amended.......†27154
160.009-5 Footnote added.......†9772
160.009-6 (b) revised.......†9770
160.047-1
  Heading, (a) introductory text, (1), and (3) revised.......†27153
  (d) removed.......†27154

46 CFR—Continued

42 (43†) FR
Page

160.047-3 (d) amended; (h) revised.......†27154
160.047-5 Footnote added.......†9772
160.047-6 (a) revised.......†9770
160.048-1
  Heading, (a) introductory text and (2) revised.......†27153
  (d) removed.......†27154
160.048-3 (g) revised.......†27154
160.048-5 Footnote added.......†9772
160.048-6 (a) revised.......†9771
160.049-1
  Heading, (a) introductory text and (1) revised.......†27153
  (d) removed.......†27154
160.049-3 (e) revised.......†27154
160.049-5 Footnote added.......†9772
160.049-6 (a) revised.......†9771
160.050-1
  Heading, (a) introductory text and (2) revised.......†27153
  (c) removed; (b) amended.......†27154
160.050-3 (b) amended; (e) revised.......†27154
160.050-5 Footnote added.......†9772
160.050-6
  (a) revised.......†9771
  (a) corrected.......†10913
160.050-7 (a) amended.......†27154
160.052-1
  (a)(1) removed; heading, (a) introductory text, (2), and (3) revised.......†27153
  (d) removed.......†27154
160.052-3 (f) revised; (c) amended.......†27154
160.052-7 Footnote added.......†9772
160.052-8 Heading and (a) revised.......†9771
160.053-1 (d) removed.......†27154
160.053-5 (a) revised.......†9771
160.055-1
  Heading, (a) introductory text, (1), (2), and (3) revised.......†27153
  (c) amended; (d) removed.......†27154
160.055-3
  (d) revised.......†27153
  (c) and (h) amended.......†27154
160.055-7 Footnote added.......†9772
160.055-8
  Heading and (b) revised.......†9771
  (b) corrected.......†10913
160.055-9 (a) amended.......†27154

NOTE: Symbol (†) refers to 1978 page numbers.

46 CFR—Continued

42 (43†) FR Page

160.060-1
(a)(1) removed; heading, (a) introductory text, (2), and (3) revised.. †27153
(d) removed.................................... †27154
160.060-3 (c) amended; (f) revised.. †27154
160.060-7 Footnote added............ †9772
160.060-8 Heading and (a) revised.. †9771
160.064-3 Footnote added............ †9772
160.064-4 (a)(1) and (2) revised... †9772
Technical correction................. †10913

1978–1979

(Regulations published from October 1, 1978 through September 30, 1979)

46 CFR

43 (44Δ) FR Page

Chapter I
161.012-1—161.012-17 (Subpart 161.012) Added........................ Δ38785
162.027-1—162.027-6 (Subpart 162.027) Heading revised......... Δ2393
162.027-2 Revised......................... Δ2393
162.027-3 (a)(1), (b) introductory text, (c), and (d) revised.. Δ2393
162.027-4 (a) revised..................... Δ2393
162.027-5 Revised......................... Δ2393
162.027-6 (a) and (b) revised....... Δ2394
162.039-3 (a) and (b) amended.................................. Δ34133
162.050-1—162.050-39 (Subpart 162.050) Added........................ Δ53358
164.018-1—164.018-13 (Subpart 164.018) Added........................ Δ38786

1979–1980

(Regulations published from October 1, 1979 through September 30, 1980)

46 CFR

44 (45*) FR Page

Chapter I
159—164 (Subchapter Q) Heading revised.................................. 73043
159 Added.. 73043
160 Incorporation by reference approvals.................................. *64816

46 CFR—Continued

44 (45*) FR Page

Chapter I—Continued
160.012-1—160.012-7 (Subpart 160.012) Removed.................. *64188
160.021-1—160.021-9 (Subpart 160.021) Revised........................ 73060
Heading revised.......................... *45280
160.021-4 (d)(8) added................ *45280
160.022-1—160.022-9 (Subpart 160.022) Revised........................ 73067
160.023-1—160.023-9 (Subpart 160.023) Revised........................ 73070
160.024-1—160.024-9 (Subpart 160.024) Revised........................ 73071
160.028-2—160.028-9 (Subpart 160.028) Revised........................ 73078
160.031-1—160.031-9 (Subpart 160.031) Revised........................ 73080
160.036-1—160.036-9 (Subpart 160.036) Revised........................ 73081
160.037-1—160.037-9 (Subpart 160.037) Revised........................ 73085
160.039-1—160.039-6 (Subpart 160.039) Removed.................. *64188
160.040-1—160.040-9 (Subpart 160.040) Revised........................ 73089
160.057-1—160.057-9 (Subpart 160.057) Revised........................ 73091
160.066-1—160.066-18 (Subpart 160.066) Added.......................... 73050
160.071-1—160.071-25 (Subpart 160.071) Added........................ *24478
Effective date corrected to 11-1-80.. *29588
160.072-1—160.072-9 (Subpart 160.072) Added.......................... 73054
161 Incorporation by reference approvals.................................. *64816
161.001-1—161.001.7 (Subpart 160.001) Removed.................. *64188
161.004-4 (a)(1) designation added.. *64189
161.013-1—161.013-15 (Subpart 161.013) Added.......................... 73054
162 Incorporation by reference approvals.................................. *64816
162.027-2 Compliance date postponed in part to 2-12-81........ *22040
162.027-3 (a)(1), (b) introductory text, (c), (d) compliance date postponed in part to 2-12-81.. *22040
162.027-4 (a) compliance date postponed in part to 2-12-81.. *22040

Note: Symbol (†) refers to 1978 page numbers.
Note: Symbol (Δ) refers to 1979 page numbers.
Note: Symbol (*) refers to 1980 page numbers.

46 CFR—Continued

45 (46†) FR Page

Chapter I—Continued

162.027-5 Compliance date postponed in part to 2-12-81........ *22040

162.027-6 (a) and (b) compliance date postponed in part to 2-12-81.. *22040

163.001-6 (a)(4) corrected.......... *64189

164 Incorporation by reference approvals.:............................... *64816

1980–1981

(Regulations published from October 1, 1980 through September 30, 1981)

46 CFR

45 (46†) FR Page

Chapter I

157.01-10 (b) amended 69242

157.10-87 Added............................ 69242

157.20-5 (b) revised.......................69242

157.20-15 Revised..........................69242

(c)(1)(iii) and (iv) correctd........ †41504

157.20-25 Revised..........................69242

157.20-35 Revised..........................69242

157.20-37 Added............................ 69243

Revised.. †41504

157.30-10 (c) removed................ †27654

160 Incorporation by reference approvals....................................72464

Incorporation by reference approvals...................................... †19660

160.071-11 (a)(1) revised............ †23428

160.071-17 (g)(2) and (h) revised... †23428

161 Incorporation by reference approvals....................................72464

Incorporation by refeence approvals...................................... †19660

162 Incorporation by reference approvals....................................72464

Incorporation by reference approvals...................................... †19660

164 Incorporation by reference approvals....................................72464

Incorporation by reference approvals...................................... †19660

Note: Symbol (*) refers to 1980 page numbers.
Note: Symbol (†) refers to 1981 page numbers.